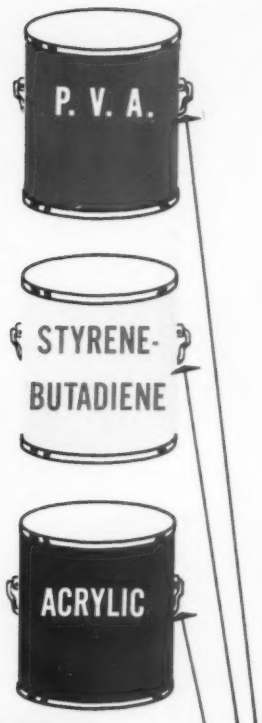
PAINT and VARNISH Production

THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES

NOVEMBER
1955



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Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint and Varnish Record)

VOL. 45 NOVEMBER, 1955 NO. 12

NEXT ISSUE

An article on catalyzed phenolic finishes for air-dry and low-temperature conversion will be presented in the December issue. Such important factors as type and performance of catalysts, application and properties of these phenolic finishes will be included in the article.

FEATURES

DEPARTMENTS

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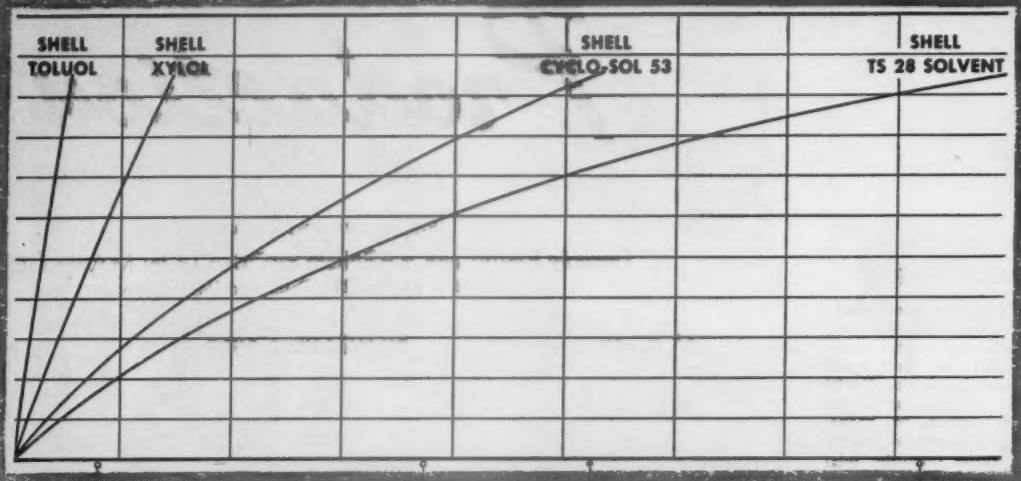

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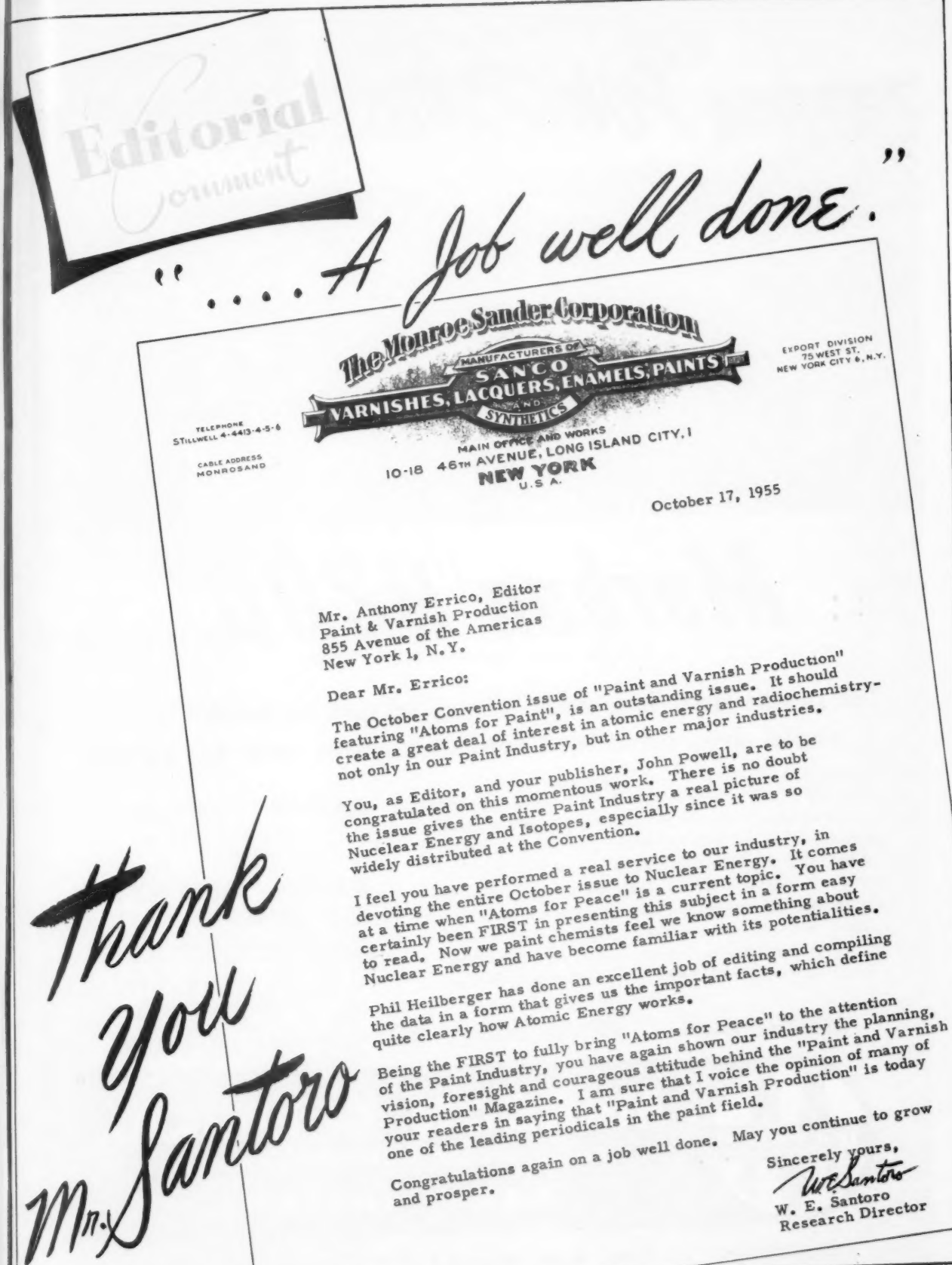

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October 17, 1955

Mr. Anthony Errico, Editor
Paint & Varnish Production
855 Avenue of the Americas
New York 1, N.Y.

Dear Mr. Errico:

The October Convention issue of "Paint and Varnish Production" featuring "Atoms for Paint", is an outstanding issue. It should create a great deal of interest in atomic energy and radiochemistry- not only in our Paint Industry, but in other major industries.

You, as Editor, and your publisher, John Powell, are to be congratulated on this momentous work. There is no doubt the issue gives the entire Paint Industry a real picture of Nucelear Energy and Isotopes, especially since it was so widely distributed at the Convention.

I feel you have performed a real service to our industry, in devoting the entire October issue to Nuclear Energy. It comes at a time when "Atoms for Peace" is a current topic. You have certainly been FIRST in presenting this subject in a form easy to read. Now we paint chemists feel we know something about Nuclear Energy and have become familiar with its potentialities.

Phil Heilberger has done an excellent job of editing and compiling the data in a form that gives us the important facts, which define quite clearly how Atomic Energy works.

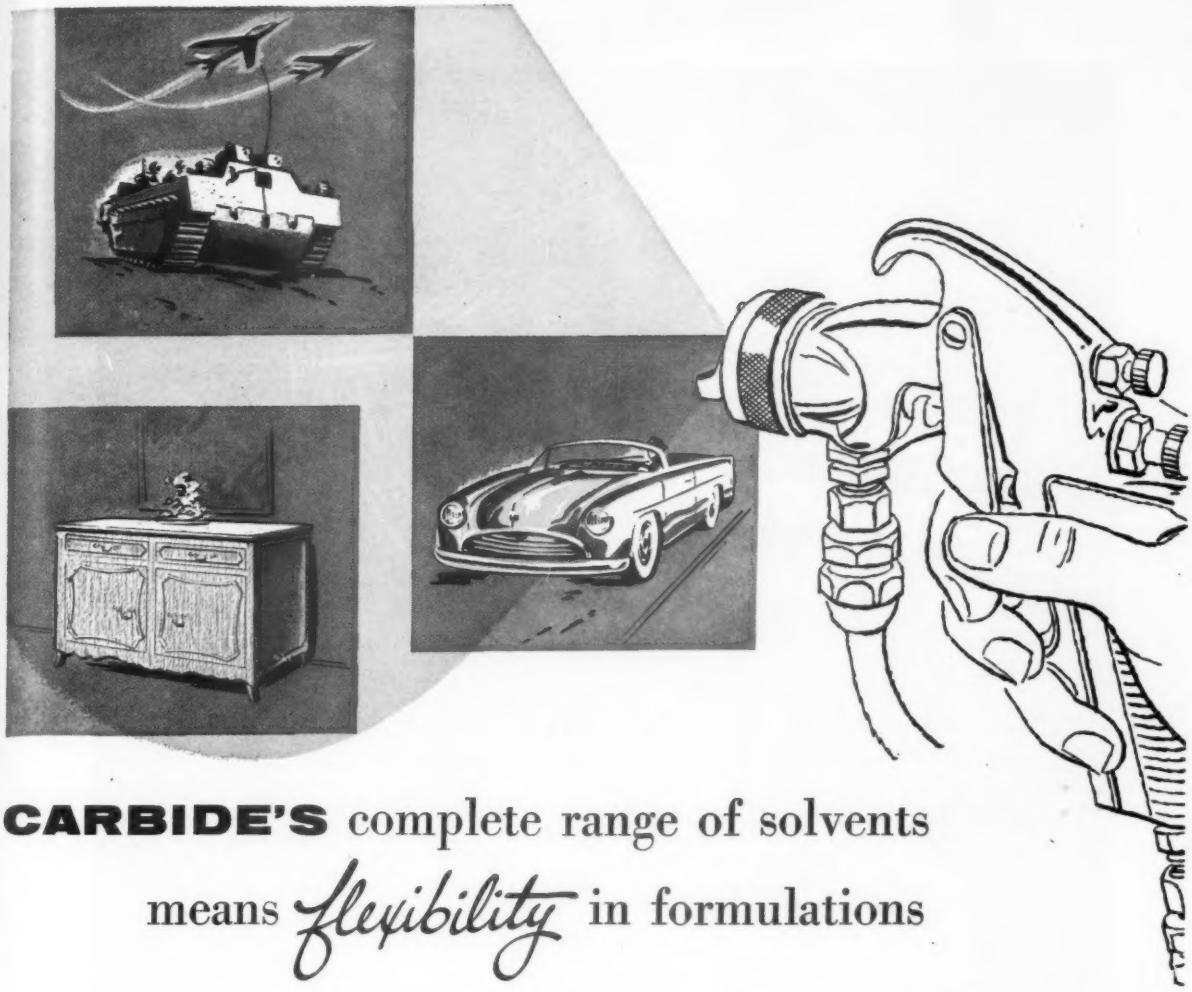
Being the FIRST to fully bring "Atoms for Peace" to the attention of the Paint Industry, you have again shown our industry the planning, vision, foresight and courageous attitude behind the "Paint and Varnish Production" Magazine. I am sure that I voice the opinion of many of your readers in saying that "Paint and Varnish Production" is today one of the leading periodicals in the paint field.

Congratulations again on a job well done. May you continue to grow and prosper.

Sincerely yours,

W. E. Santoro
Research Director

Thank You Mr. Santoro



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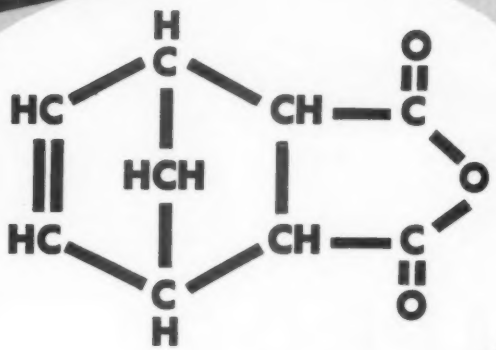

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Have you considered how you can capitalize upon its reactive double bonds and the many opportunities for cross linkage? We will be pleased to cooperate fully with those whose work may lead to expanded commercial use of "Nadic" Anhydride.

WRITE FOR TECHNICAL BULLETIN I-5

This 12-page digest of the properties, reactivity and suggested uses of "Nadic" Anhydride also includes a list of 68 literature references. It should be a helpful springboard to progress on current uses and future applications. A copy will be sent without cost or obligation.

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a message of interest to all sellers and buyers

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The vinyl paint discussed above is unusual. It forms tougher films, contains a higher percentage of pigment and resists water better than ordinary vinyl paint. It is one of many exterior—and interior—formulations based on RESYN 12K-51, National's inherently flexible copolymer emulsion. Details available upon request.

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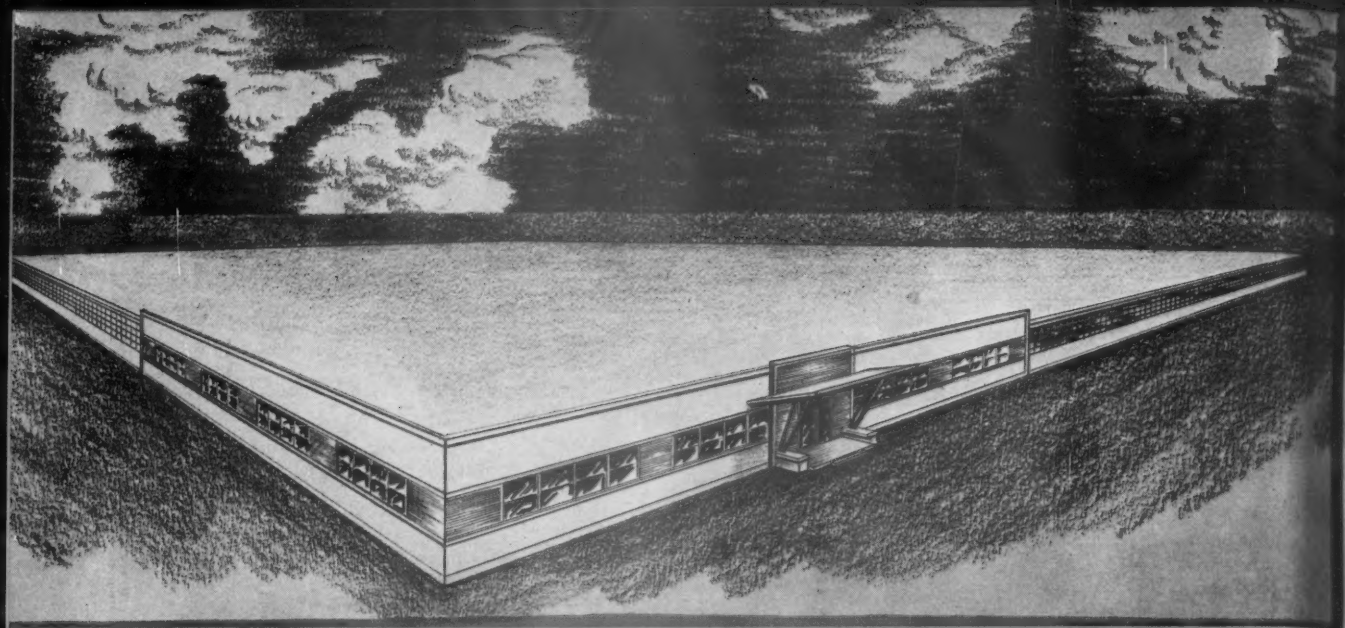

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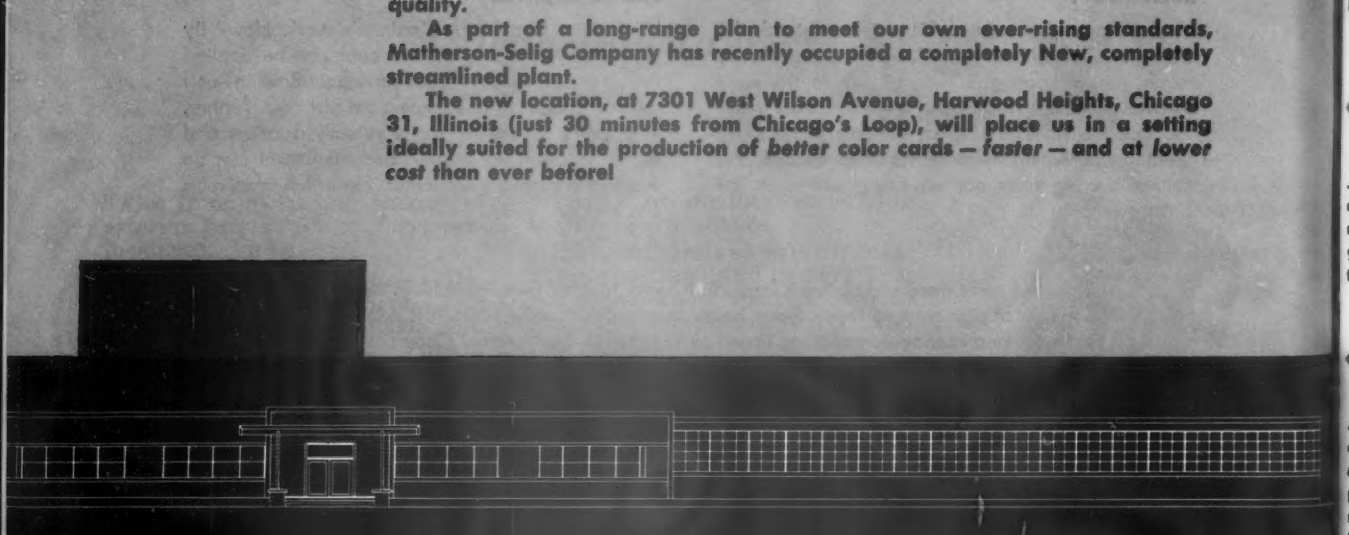

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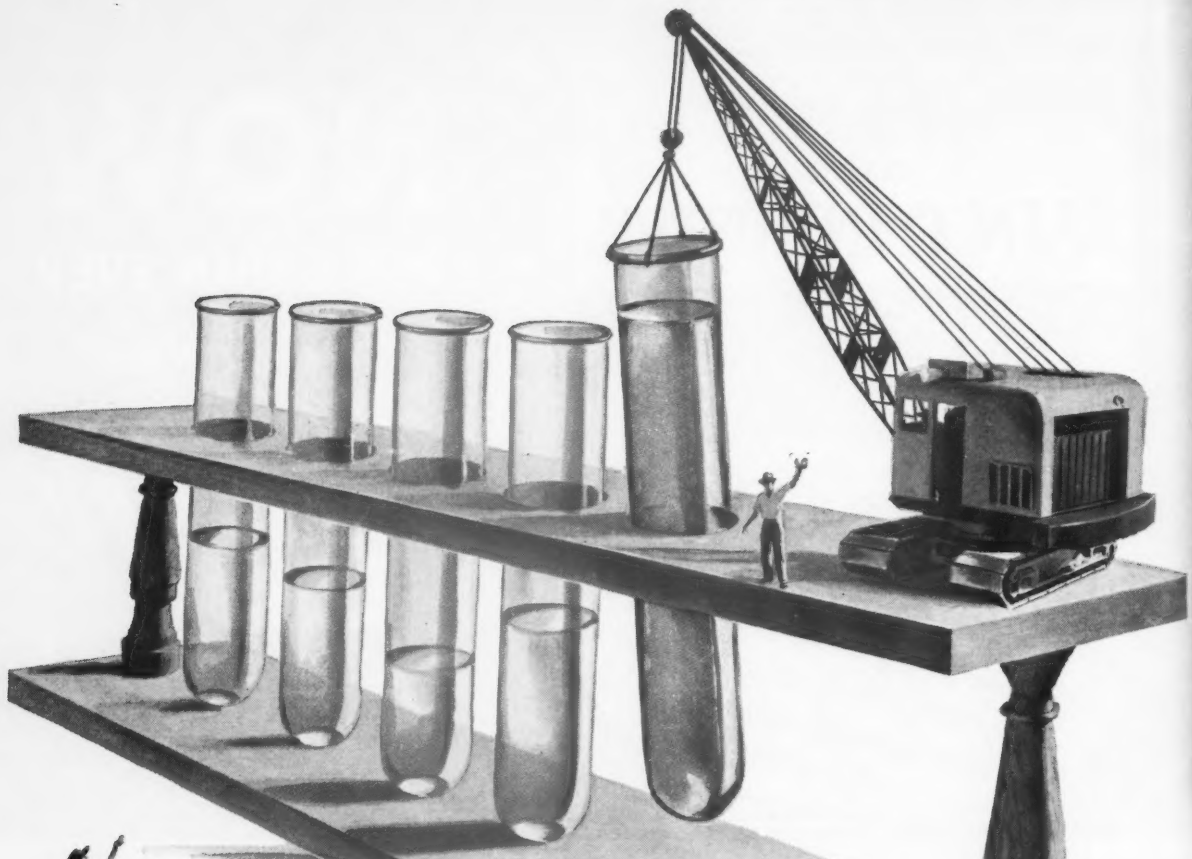

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†1, 3—Butylene Glycol, for instance . . . or Methyl Isopropenyl Ketone.

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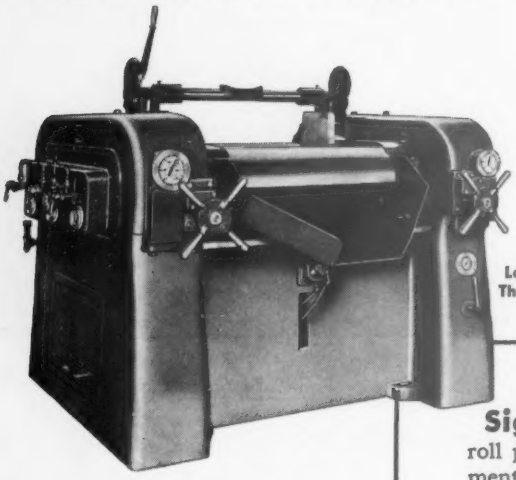

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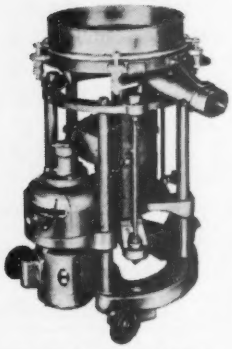
Models 631-V and 662-V Three Roll Sight-O-Matic* Paint Mills. Exact changes in roll pressure are visible to the operator as he makes adjustments in them, assuring fast, accurate, positive setting to accommodate the requirements of any formulation. Proper take-off knife pressure is precisely set to gage reading and held constant by simple pneumatic device. Dial thermometers guide control of discharge water temperatures from each roll.



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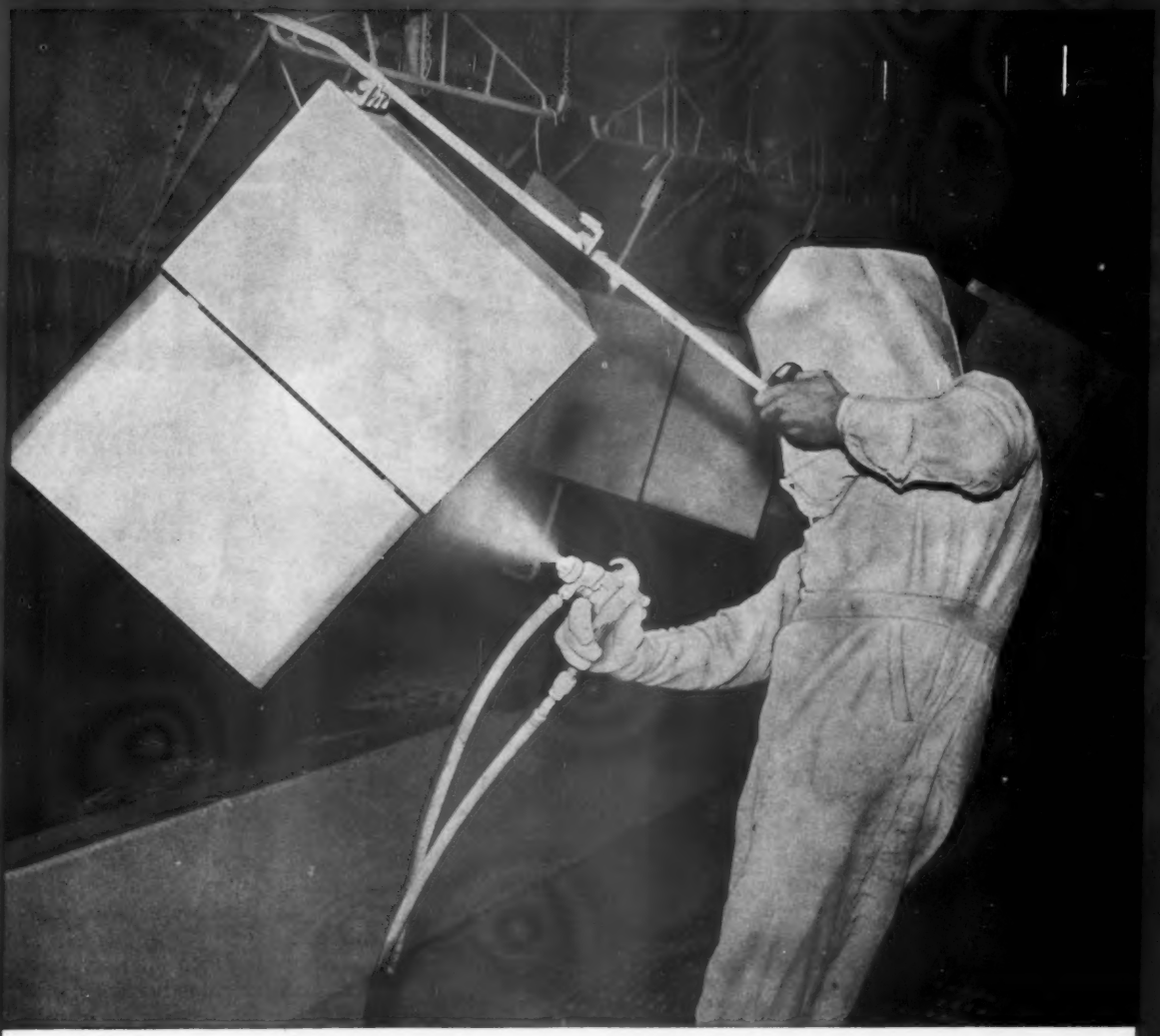

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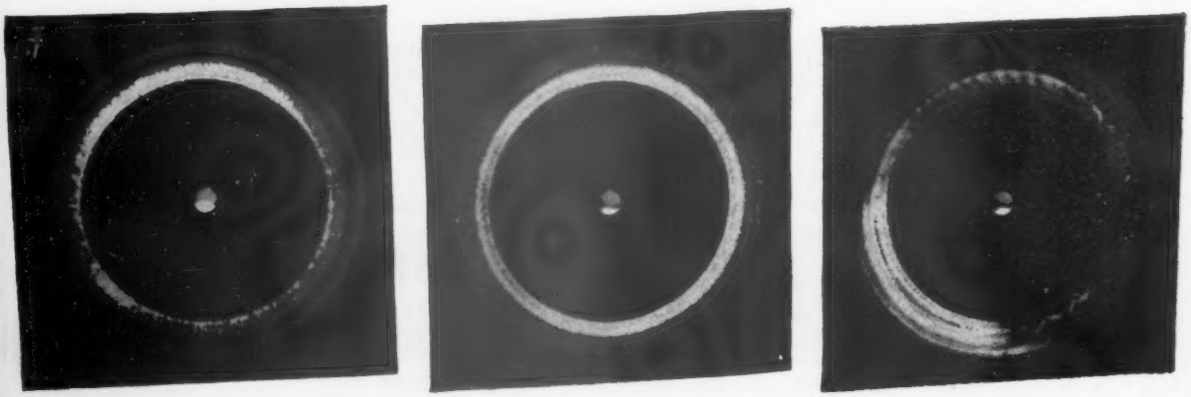

abrasion resistance

with Organosol Metal Coatings formulated with BAKELITE Vinyl Dispersion Resins

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Wear Test Shows Superior Durability of the new wrinkle-finish coating at right. Below, after 4000 revolutions under a 17H emery wheel in standard Tabor Abrasion test, it shows little sign of wear. Standard types of coatings, shown at left, wore through to white metal primer in 528, 88, and 497 revolutions respectively.

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Vinyl, Phenolic and Epoxy Resins
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David Atlas, works manager of the Minneapolis Mill, is interested in the basic properties of the seed itself. For example, what will be the iodine value of the oil? Nature fixes that, not in all seed alike but varying with when and where the seed was grown. Kellogg technicians, specifying how one batch of seed shall be blended with another, control this property of the oil.

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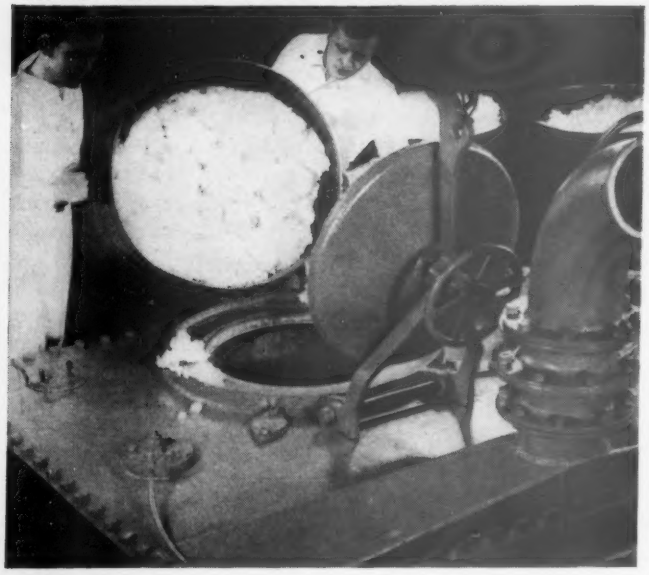

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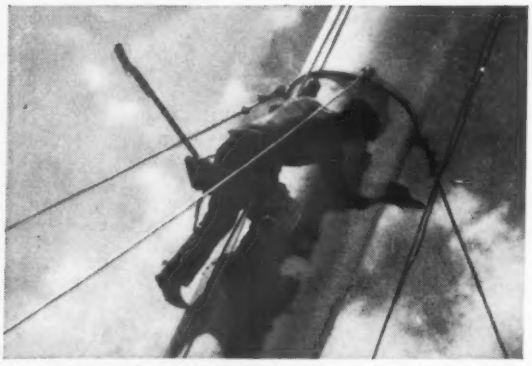

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PARANOX	PETROHOL 91	PETROHOL 91
PARATONE	PETROHOL 95	PETROHOL 95
PARAFLOW	PETROHOL 99	PETROHOL 99
PARAPOID	JAYSOL	JAYSOL
PARADYNE	Secondary Butyl Alcohol	Iso-Octyl Alcohol
PARATAC	Secondary Butyl Acetate	Decyl Alcohol
PETROHOL	Isopropyl Acetate	Denatured Ethyl Alcohol
Methyl Ethyl Ketone	Acetone	Tridecyl Alcohol
Dewaxing Aid	Methyl Ethyl Ketone	Dicyclopentadiene
Ethyl Ether	Dicyclopentadiene	Isoprene
Isopropyl Ether	Ethyl Ether	Butadiene
Reference Fuels	Isopropyl Ether	Ethyl Ether
RUBBER	Naphthenic Acids	Isopropyl Ether
Enjay Butyl	'so-Octyl Alcohol	Tetrapropylene
Vistanex	Decyl Alcohol	Tripropylene
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A Staff Report

ISOCYANATE RESINS FOR COATINGS

PART I

In recent years, isocyanates have created considerable interest as a new class of coating resins. In order to keep you abreast of this important development, we are presenting a comprehensive article (in two parts) on these unique polymers.

This part is chiefly concerned with the preparation and manufacture of isocyanates, their properties, and the many chemical reactions involved.

Part II, which will appear in the December issue, covers the polyurethanes and the many applications of isocyanate polymers.

ISOCYANATE resins are a relatively new class of synthetic resins which were developed chiefly in Germany starting in 1937. They are best represented by the polyurethanes which are formed by the reaction of polyisocyanates with polyhydroxy compounds. The polyurethanes are unique in that they are prepared by a seldom-encountered mechanism of polymerization and that they have been applied in a multitude of different ways, ranging from bristles to tanning agents to coatings.

A thorough understanding of the use and value of these novel materials in the coatings field requires a review of the original and modern work on the various isocyanates and their associated resins

Background

The background of the urethane reaction was established by Wurtz (1) in 1848, who prepared the first isocyanate, ethyl isocyanate. Wurtz showed that this material added smoothly to alcohol to yield ethyl urethane and to secondary amines to yield substituted ureas: $(R_1)—(R_2)$.

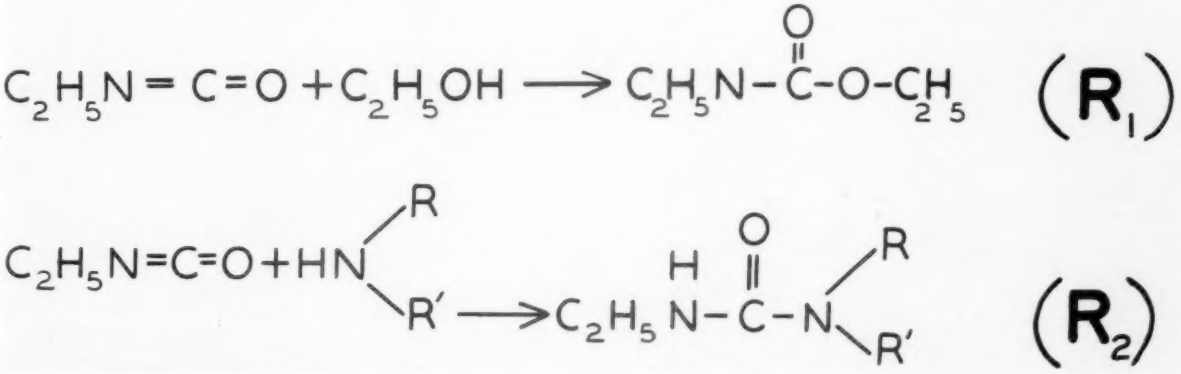
This is accomplished by the shifting of the active, labile hydrogen of the hydroxyl or amino group to the nitrogen atom of the isocyanate group, the rest of the molecule adding on to the carbon of the isocyanate carbonyl group.

In 1849, Hoffman extended these observations to the aromatic series with phenyl isocyanate, $C_6H_5N=C=O$. The bifunctional analogues, the diisocyanates, $O=C=N-R-N=C=O$, were first described by Snape in 1886 (2), although it is highly doubtful that he succeeded in isolating the pure compounds. In more recent years, progress has been more rapid and some hundreds of mono- and polyisocyanates have been prepared, isolated and identified. (3,4,5)

Methods of Preparation

Isocyanates have been prepared by a number of methods, a list of which is presented here:

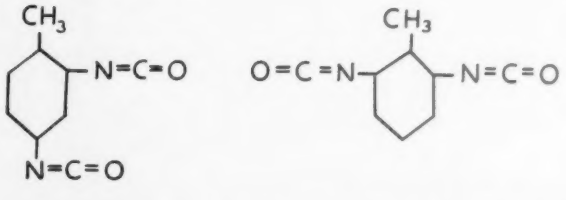
1. Treatment of amines, amine salts, amides, amino-azo compounds, urethanes and substituted ureas with phosgene at elevated temperatures. (6-21, 179, 238, 269, 277)



2. Reactions between the acid chlorides and anhydrides and sodium azide. (22-28)
3. Treatment of hydroxamic acids with acid chlorides. The hydroxamic acids are made by condensing hydroxylamine hydrochloride with the corresponding ester or anhydride. (29,30)
4. Pyrolysis of N-carboxyethyl ketimines and aldimines, obtained by reacting the corresponding ketal or acetal with ethyl urethane. (31)
5. Dehydration of urethanes with phosphorus pentoxide or pentachloride. (28, 32)
6. Reaction between alkyl iodides and silver cyanate, or between alkyl sulphates and potassium cyanate. (33, 34, 35) This is the reaction first used to make isocyanates.
7. Oxidation of isocyanides and isothiocyanates with mercuric oxide. (36)
8. Action of potassium cyanate and copper on diazonium salts. (4)
9. Action of nitrous acid on monosubstituted ureas in the presence of acid. (4)
10. Addition to unsaturated hydrocarbons of iodoisocyanates. (37)
11. Reaction of amides and hydrobromic acid. Hoffman degradation.) (38)
12. Heptamethylene diisocyanate and other isocyanates have been prepared using azelaic acid (from castor oil) as a starting material. (285) Furfural has also been used for this reaction. (149, 195)

Manufacture of Diisocyanates

All the methods tabulated above have been used to prepare various isocyanates. However, the phosgenation method is the most widespread and satisfactory for almost all the isocyanates, and specifically for one of the most important members of the family, toluene 2,4-diisocyanate (or meta-tolylene diisocyanate). Therefore this reaction will now be considered in greater detail in the course of the description of the manufacture of toluene 2,4-diisocyanate in Germany. (4, 39)



The German product was called "Desmodur T" and was a mixture of the two diisocyanates:

There were two reasons for using this mixture of the 2, 4- and the 2,6- compounds:

a. This mixture resulted automatically from the manufacture of the diamine subsequently converted to the diisocyanates.

b. The mixture had a lower melting point than a pure 2,4-diisocyanate and remained liquid under all normal conditions.

The following description is of the I. G. Farbenindustrie pilot plant at Leverkusen, Germany which, during the Second World War, was engaged in manufacturing Desmodur T for the German war potential. (39)

Production of Mixed Diamines. ("Tolamin")

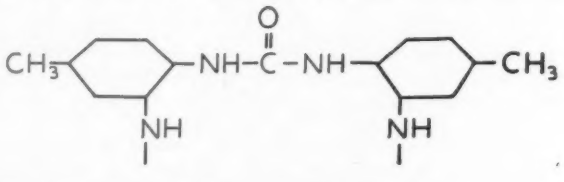
The raw material used was ortho-nitrotoluene. This was further nitrated to give a mixture of 2,4- and 2,6-nitrotoluene by treatment with a mixture of 33.5% nitric acid and 66.5% sulphuric acid. The product was then reduced to the diamines as follows:

A mixture of water, sulphuric acid and iron lathe turnings were put into the reducing vessel, the mix heated to the boiling point, and the molten dinitrotoluene added over a period of 1¼ hours. A slurry of calcium hydroxide and sodium carbonate was added to precipitate the dissolved iron. The contents were then filtered, vacuum evaporated, and finally distilled at a temperature of 165-170°C. and a vacuum of 12-15 mm. Hg.

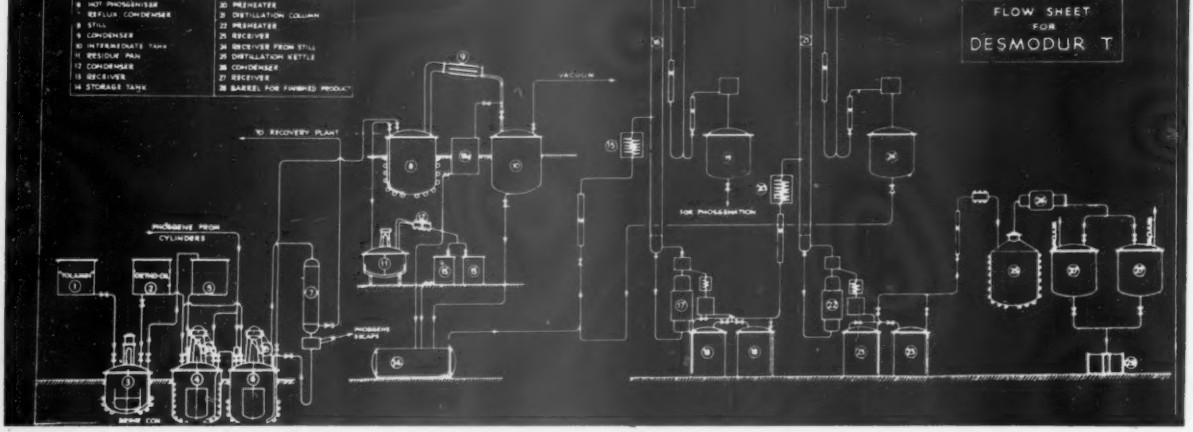
The resulting mixture of the 60-80% of 2,4- and 40 20% of 2.6-diamines was now ready for phosgenation.

Operation of Diisocyanate Pilot Plant

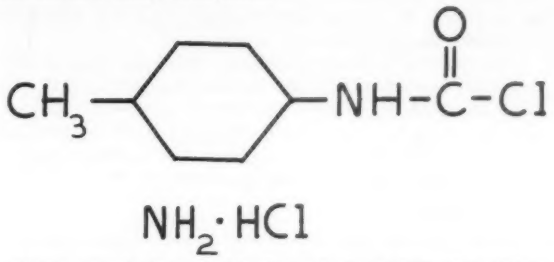
The diamine mixture (Tolamin) was stored in tank 1 (see Flow Sheet, Figure 1). and the solvent, ortho-dichlorbenzene ("Ortho-oil") in Tank 2. The Tolamin was dissolved in ortho-oil in the steam-jacketed vessel 3 and pumped to a header tank 5 from which the solution was taken to the first phosgeniser 4. A previously prepared solution of phosgene in ortho-oil was run slowly into the first phosgeniser over a period of 4-5 hours while the temperature was maintained at 0-5°C. by circulating brine in an internal coil. If temperature rose, polymers of type below were formed.



Flow sheet showing the chemical processing involved in the operation of a diisocyanate pilot plant



The reaction is very exothermic. At 0-5°C., mixed carbamyl chlorides and amine hydrochlorides of the type shown were formed as a bulky precipitate.



Upon completion of this first phosgenation, the mixture was run into the hot phosgeniser 6 where a large excess of phosgene was passed, over a period of about 15 hours, into the solution maintained at 150-160°C.

The product was then freed of excess phosgene and HCl by blowing with nitrogen and then transferred to vacuum still 8 to remove the ortho-oil and the diisocyanates from the residue. The ortho-oil and crude Desmodur T were collected in tanks 10 and 10a. The extraction of the remaining ortho-oil and Desmodur T from the residue was carried out in digester 11 via condenser 12 to a tank 13. All of the ortho-oil and diisocyanates eventually found their way to the collecting tank 14. The residue was treated with caustic soda to recover residual diamines . From tank 14, the solution was pumped to an adjoining building where it was subjected to further continuous fractional distillation in the Raschig column 16. Ortho-oil was collected in receiver 19 for reuse. Crude Desmodur T was collected in receiver 18 and was subjected to further continuous distillation in column 21 from which it was collected in receiver 23. It was subjected to a final discontinuous distillation in still 25 at 105-110°C under a vacuum of 15 mm. Hg. to avoid polymerization. The diisocyanates were then pumped into the storage tank 27 from which drums 28 were filled as required, ready for shipment.

Recovery of Phosgene

The mixture of phosgene, HCl, and ortho-oil vapors produced by nitrogen blowing were separated in a recovery plant adjoining the pilot plant. The vapors were first passed into a washer supplied with ortho-oil at 0°C, which dissolved the phosgene and left the HCl to be absorbed by water in another scrubber. The solution of phosgene in ortho-oil was then preheated and passed into an evaporator which separated out the ortho-oil; this was then cooled and refrigerated to 0°C and recirculated to absorb more phosgene. The phosgene was cooled for reuse.

Theoretical Chemistry and Engineering Aspects

At this point, it would be of interest to discuss the chemical and engineering aspects of the manufacture of isocyanates.

Pinner (4) states that the conversion of amines to isocyanates by means of phosgene is clearly a reversible, heterogeneous reaction. In the case of bifunctional reactants, several steps are involved. The mechanism is probably as follows: $(R_3, -(R_9)$.

Monoisocyanates:

$$RNH_2 + COCl_2 \rightleftharpoons RNHCOCl + HCl \quad (R3)$$

(substituted carbamyl chloride)

$$RNHCOCl \rightleftharpoons RNCO + HCl \quad (R4)$$

$$RNHCOCl + R'NH_2 \rightleftharpoons RNHCONRR' + HCl \quad (R5)$$

Diisocyanates:

$$H_2N\text{-}R\text{-}NH_2 + COCl_2 \rightleftharpoons ClH\text{-}H_2N\text{-}R\text{-}NHCOCl \quad (R6)$$

$$ClH\text{-}H_2N\text{-}R\text{-}NHCOCl + COCl_2 \rightleftharpoons Cl\text{-}CONH\text{-}R\text{-}NHCOCl + 2HCl \quad (R7)$$

$$Cl\text{-}CONH\text{-}R\text{-}NHCOCl \rightleftharpoons OCN\text{-}R\text{-}NCO + 2HCl \quad (R8)$$

$$Cl\text{-}CONH\text{-}R\text{-}NHCOCl + H_2N\text{-}R\text{-}NH_2 \longrightarrow Cl\text{-}CONH\text{-}R\text{-}NHCO\text{-}NH\text{-}R\text{-}NH_2 + HCl \quad (R9)$$

It is evidently necessary to select conditions that will favor the sequence of reactions (R_3) and (R_4), in the case of the monoisocyanates, and the sequence of $(R_{6,\ 7,\ 8})$ in the case of the diisocyanates.

The development of the diisocyanates had been retarded by the difficulties inherent in their manufacture. These difficulties apart from the stringent precautions necessary in the employment of phosgene, arise from the low rate of reaction and the formation of undesireable side products, such as disubstituted ureas and polyureas.

The conversion involves the reaction between a solid (or molten liquid) and a gas, giving rise to a liquid and a gas. Salient factors concerning the rate of reaction are, therefore, the state of sub-division of the solid reactant, its solubility in the solvent used and in the reaction mixture, the extent of agitation, and the concentration of phosgene and HCl in the reaction mixture. Modern methods such as the one described and others (6,40,41,42,43) take cognizance of these factors. Consideration must also be given to the elimination of conditions favoring the formation of substituted ureas, according to reactions (R_5) and (R_9). These are: the presence of traces of water, HCl, impurities in the amines, metals, metallic compounds and bases. In addition, in order to obtain good yields, it was essential to use phosgene which was completely free of iron pentacarbonyl, $Fe(CO)_5$. (44)

The advocacy of catalysts, such as zinc chloride and its analogues (14), and dimethyl aniline (45,46), is questionable on two counts:

a. The applicability of other than surface catalysts in heterogeneous reactions is doubtful.

b. Such catalysts, even when effective, may favor the continuation of the reaction beyond the isocyanate stage.

So far as large scale manufacture is concerned, the plant should be constructed of stainless steel, chromium, or pure lead; the amines, solvents and phosgene should be of the highest possible purity. The German pilot plant was homogeneously lead lined throughout; stainless steel would have been preferred but was unattainable. (39)

Under the most favorable conditions, 75-85% yields may be obtained on the plant. Any polyurea product may often be saponified back to the original diamine. (4,41) At Leverkusen, the aliphatic diisocyanates were obtained with yields of 85% (based on diamine) using 125% theoretical phosgene; aromatic diamines gave 90% yields. (44)

The phosgenation procedure is unsuited to short chain diamines inasmuch as the formation of cyclic ureas is favored. (44) In such cases, it is necessary to resort to the sodium azide method, which is however very hazardous on the commercial scale. This method has been used in the preparation of unsaturated isocyanates, such as vinyl isocyanate. (26)

General Properties of Isocyanates

Methyl and ethyl isocyanate are volatile, pungent smelling liquids. Phenyl isocyanate is a colorless liquid, the vapor of which, even at normal room temperatures, is irritant and lachrymatory. Indeed, an important reason for the slow development of the isocyanates was their evil-smelling and tear-provoking characteristics.

Cyclohexyl isocyanate and tolyl isocyanate resemble phenyl isocyanate, but are somewhat less irritant. Alpha-naphthyl isocyanate is a less mobile liquid of somewhat reduced activity towards water. The diisocyanates, in spite of their reduced volatility, also have an irritant odor. All inisocyanates react more or less readily with water and have to be stored in sealed containers. They generally show some physiological activity. Phenyl isocyanate has been shown to deactivate hormones. (47)

It was found necessary in Germany to replace free toluene 2,4-diisocyanate in bonding compositions by less volatile,

partially condensed analogues to reduce discomfort during their employment. (This will be discussed fully in Part II). The actions of the isocyanates, when used by workers with lacquers and plastics based on polyurethane resins, did result in serious irritations and allergic effects. (4,44)

For these reasons, Desmodur H (hexamethylene diisocyanate) is no longer made in Germany. Desmodur T, although quite toxic in itself, is too valuable a raw material to do without. Blocked Desmodurs (TH and THN), with a relatively low toluene 2,4-diisocyanate content, are much less toxic. Desmodurs with low vapor pressures are handled without complications.

Unpublished work by Gross and Helbrung (1941) showed considerable irritant action of isocyanates on the skin, eyes and mucous membranes of experimental animals. Human subjects are similarly affected as shown by the number of cases encountered in the manufacture of Moltopren and J-Gummi (foamed resins) and in handling Desmodur-based coatings. (331)

Recent work has shown that Desmodur R (a triisocyanate) is not toxic. (288)

Reactions of Isocyanates (4,5,48,157)

The characteristic and principal reaction of the isocyanate group is that of addition with compounds containing reactive hydrogen atoms. The hydrogen atom migrates to the nitrogen atom of the isocyanate group and the remainder of the molecule attaches itself to the carbon atom. Thus amines react to give substituted ureas while alcohols give urethanes. In fact, recent writers in the field have suggested the term "Polyaddition" for the isocyanate reaction, instead of polycondensation, which is commonly used and which is not entirely accurate. (252)

Isocyanates react with amino groups about 200 times faster than with hydroxyl groups. They react with amino groups in the presence of water, but not with hydroxyl groups under the same conditions. The sequence of reactivity is indicated in reaction (R10).

$-NH_2 > H_2O >$ primary OH $>$ secondary OH $>$ tertiary OH $>$

phenolic OH $>$ COOH $>$ $CONH_2$ (R_{10})

in some measure, to steric hindrance. It was also found that secondary aliphatic and alicyclic isocyanates are much less reactive towards alcohols than are aromatic or benzyl isocyanates. Primary aliphatic isocyanates fall somewhere in between the two classes.

Generally the isocyanate addition reactions proceed under very mild conditions, usually at room temperature, or after moderate heating, without the use of catalysts. However such materials as urea, acids, alkalis, cobalt naphthenate, aluminum chloride, tertiary amines and pyridine may be used to catalyze certain of the reactions. (5,49)

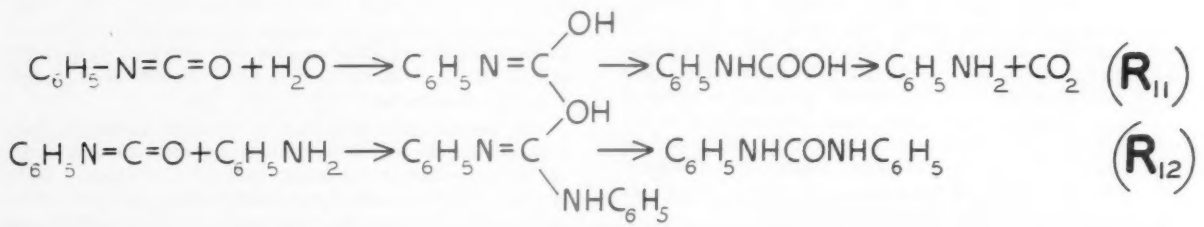
Reaction with Water

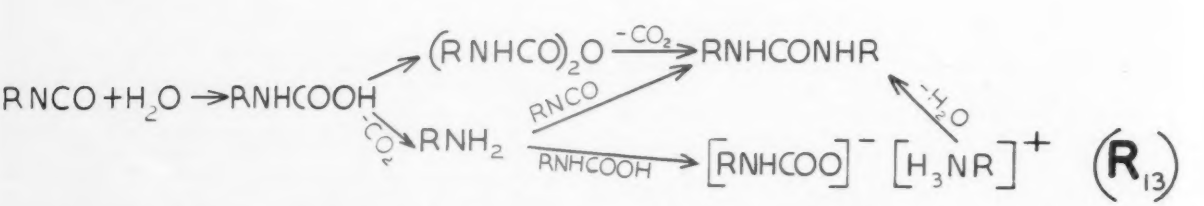
All isocyanates react with water to give substituted ureas. In many cases the reaction is violent and instantaneous, but in others a rapid reaction occurs only if a catalyst, e.g. pyridine, is present. For example, octadecyl isocyanate can be emulsified with water and will be stable as such for a short time. In these reactions with water, the formation of the substituted urea is accompanied by a loss of carbon dioxide.

Much work has been done on the mechanism of the reaction with water. (50,51) Reactions ($R_{11,12,13}$) summarize these findings: ($R_{11}-(R_{13}$).

The reaction of diisocyanates with water is particularly interesting inasmuch as cyclic compounds or polymers may result. Reaction of one mol of water with one mol of diisocyanate gives rise to the iminazole compound, glyoxalane, if ethylene diisocyanate is used (reaction (R_{14}); whereas phenylene diisocyanate gives benziminazolone or o-phenylene urea. Similarly a diisocyanate with 3 carbon atoms would yield a pyrimidone. (R_{14}).

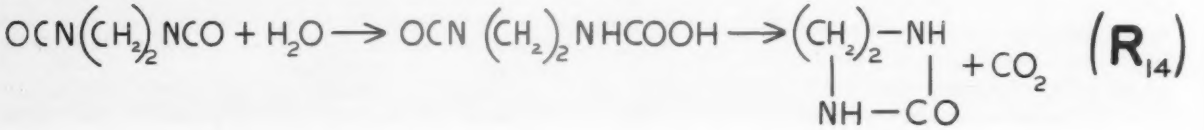
According to the ideas of Baeyer and Carothers, these 5- and 6-membered rings are the most likely products if the diisocyanate has 2 or 3 carbon atoms. With a greater separation between the isocyanate radicals, as in hexamethylene diisocyanate, self-cyclization is less likely. Ring compounds may result from the union of two molecules of the diisocyanate (reaction R_{15}), but a step reaction leading to the formation of linear polymers is more probable. (reaction R_{16})

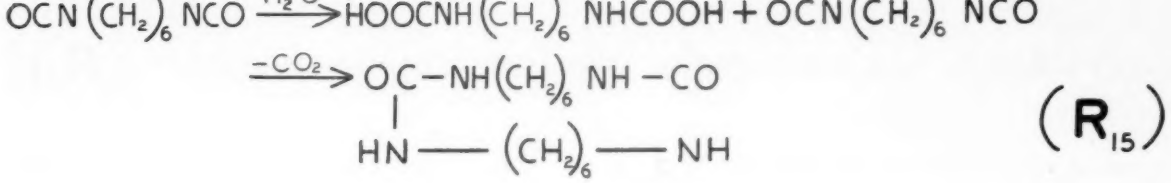


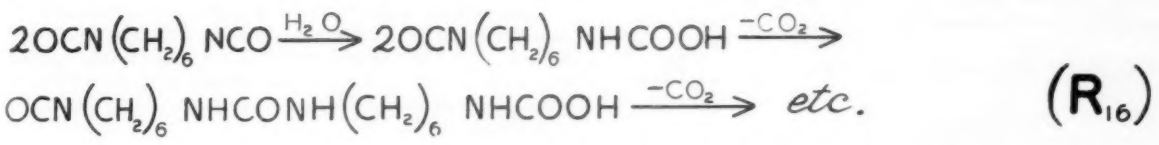


Some recent work in Germany has shown that isocyanates themselves vary in reactivity (44). The rate of reaction of aromatic isocyanates with alcohols is decreased greatly by the presence of bulky groups in the ortho position, due,

Whether these products are indeed derivable has not been reported, but it is noteworthy that all diisocyanates examined have reacted with water to give insoluble, infusible solids.





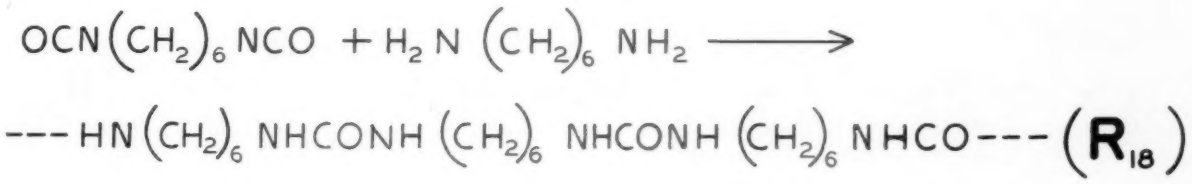


Reactions with Amines

Isocyanates condense with primary and secondary amines (reaction R_{17}). Phenyl isocyanate should be reacted in the absence of water but alpha-naphthyl isocyanate will react with aqueous solutions of aliphatic amines, preferably in alkaline media.

The amine reaction is the basis of analytical methods for hexamethylene diisocyanate, benzyl and cyclohexyl isocyanate. (132)

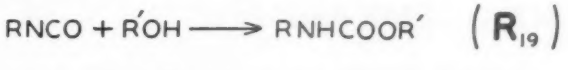
The effect of substituents in this reaction has been investigated and it is reported that organic acids are catalysts. (52) With diisocyanates and diamines, linear polyureas form very readily. (Reaction R_{18})



Polymers have been formed directly from bischloroformates and polyamines through emulsion polymerization techniques. (299) A product of this type has been made in Japan. It is called "Poluran" and is prepared from tetramethylene diamine and hexamethylene dischloroformate. (194)

Reaction with Alcohols

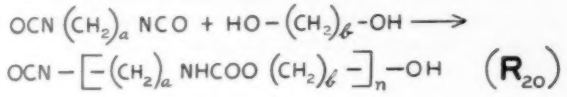
Isocyanates react with alcohols to form urethanes or carbamates. (Reaction R_{19})



The reactants should be anhydrous. Simple alcohols react spontaneously with the lower isocyanates; secondary, tertiary and polyhydric alcohols react less readily. (53, 171) The rate of reaction of phenyl isocyanate with 1- and 2-butanol has been studied; the reaction is one of the second order. (180)

Glycols require considerable heating for both hydroxyl groups to react. Phenols behave in a similar manner, but when negative groups are present, the reaction should be catalyzed by tertiary amines, e.g. trimethyl amine (45) or aluminum chloride. (54) Fractionated reaction products of phenol and formaldehyde have been treated with phenyl isocyanate to form polymers and unique compounds. Here the isocyanate group reacts with both the phenolic and methylol hydroxyl groups. (294)

Diisocyanates react with glycols to form polyurethanes. (Reaction R_{20}) These products will be discussed at great length throughout this article.



Reaction with Grignard Reagents

This reaction is used in the identification of organic halides in organic analysis, where the halide is first converted into a Grignard compound by treatment with magnesium. Since there is no free hydrogen atom in the Grignard, the normal Grignard addition to the carbonyl occurs, and the product rearranges after hydrolysis to yield a substituted amide. (55) (Reaction R_{21})

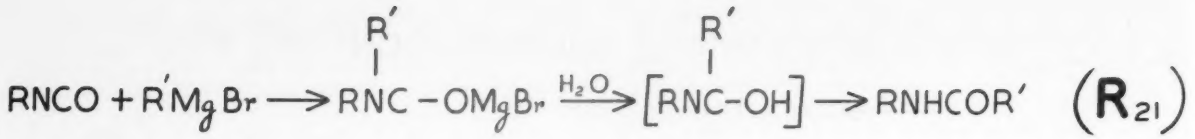
Reaction with Aromatic Hydrocarbons

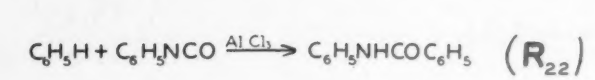
Under the influence of aluminum chloride and similar Friedel-Crafts catalysts, isocyanates may add on to aromatic hydrocarbons to give amides, (reaction R_{22}) (56)

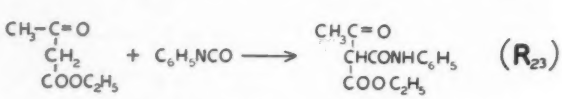
Reactions with Keto-Esters and Diketones

The reactive methylene group allows migration of a hydrogen atom to the isocyanate radical with fusion of the residues to give a C-carbanilide derivative. (reaction R_{23})

Compounds which are capable of enolizing are similarly reactive towards isocyanates in the presence of sodium. Such compounds are nitromethane (57), malonic ester (58) and aceto-acetic ester (59).





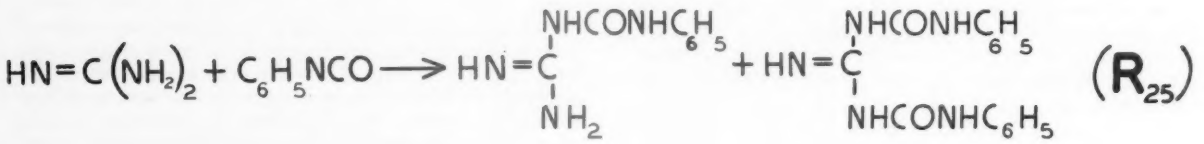


Reaction with Ammonia

Simple addition occurs with ammonia to give a mono-substituted urea. (reaction R_{24})

Reaction with Guanidine

This reaction is best carried out in alkaline solution; the products include mono- and di-carbanilide guanidine, if phenyl isocyanate is used. (reaction R_{25})



Corresponding reactions occur with urea, thiourea, and urethane to give biuret and substituted ureas. (60)

Reaction with Amino-acids and Substituted Hydrazines

Isocyanates react with amino acids to give, among other things, hydantoic acid derivatives, and with substituted hydrazines to yield substituted carbazides. (61) The reaction with amino acids is said to proceed only in aqueous solution. (62, 63) (Reactions R_{26}, R_{27})

Reaction with Carboxylic Acids

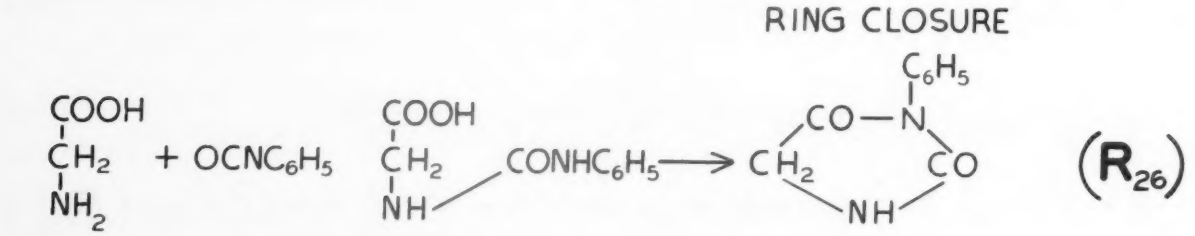
This reaction leads to ill-defined products, but there is much evidence that substituted amides and anhydrides are formed. (67, 68) Amides result by the condensation of one mol each of the reactants; anhydrides and disubstituted ureas by condensation of two mols each. In all cases CO_2 is liberated. (Reactions R_{28}, R_{29})

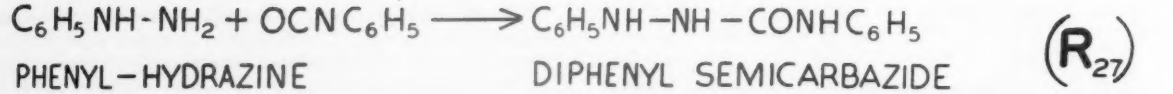
Thiobenzoic acid reacts without the loss of CO_2 at ordinary temperatures. (69) (reaction R_{30})

However, in general, sulphur compounds behave in the same way as their oxygen analogues; this also holds true for the isothiocyanates.

Reaction with Amides

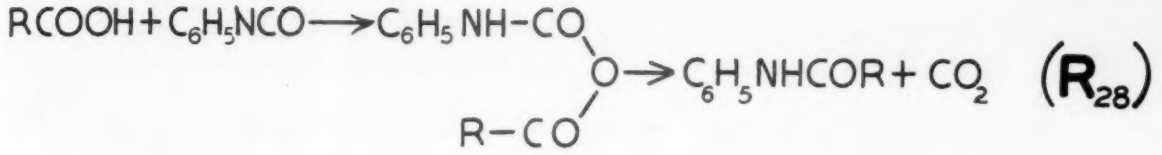
Amide groups enter into reaction with isocyanates in the same fashion as amino groups. In this case, acyl-substituted ureas result. (70) (Reaction R_{31})

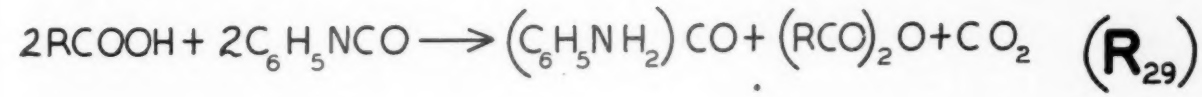


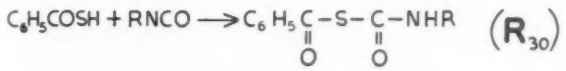


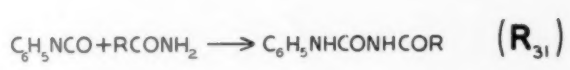
Other nitrogen compounds, such as amidines (64), nitramines (65), and diazo compounds (66) react similarly. Reaction with alpha-amino nitriles produces substituted ureas (273) The polymerization of the isocyanate derivative of a polypeptide has been studied and reported (231).

Carbamide has been reacted with diurethanes to form polymers. (163) Modified polyamides are formed by the reaction of aliphatic diamines, dibasic acids and diisocyanates. (201) Isocyanates react with sulfonamides to form compounds of the type $RSO_2NHCONHR'$. (206)



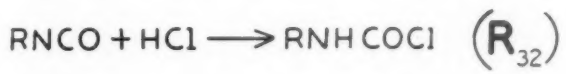






Reaction with Halogen Acids

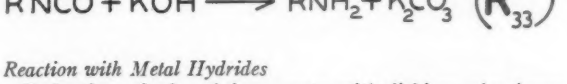
Isocyanates react with hydrogen fluoride (71) as well as with hydrogen chloride (72,73) to form carbamyl halides. (reaction R_{32})



The carbamyl halides are stable at room temperature, but tend to dissociate into isocyanate and hydrogen halide in the range of 90-100°C. The preparation of F-substituted aromatic isocyanates has been reported as well as their use as intermediates for chemicals and herbicides. (284)

Reaction with Alkali

Treated with alkalis, the isocyanates decompose to CO_2 or to carbonates and the corresponding amine. (reaction R_{33})



Reaction with Metal Hydrides

Reduction of phenyl isocyanate with lithium aluminum hydride yields the phenyl methyl amine, $C_6H_5NHCH_2$. (291)

Reaction with Phenol-Formaldehyde Resins

This reaction produces high molecular weight resins. These have been fractionated and their molecular weight studied. (294)

Reaction with Cellulose and Cellulose Derivatives

The isocyanate group reacts only with great difficulty with the hydroxyl groups of cellulose, and any apparent effect is due probably to urea formation with water in the fiber, followed by reaction of the urea group with more isocyanate. (44) Phenyl isocyanate reacts in pyridine solution with cellulose, but 1000% excess of the reagent must be used.

An ethylene urea reagent has been proposed

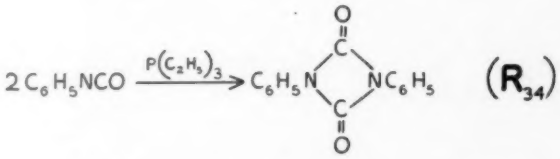
(prepared by reacting an isocyanate group with ethylene imine), which allegedly reacts with the hydroxyl groups in cellulose to give the grouping: R-NH-CO-NH$(CH_2)_2$O—cellulose. However, although this reagent would probably work, it would be rather too expensive for commercial application.

Isocyanates react with dry cellulose ethers. They also react with cellulose acetate, but applications for the insolubilized product have been few.

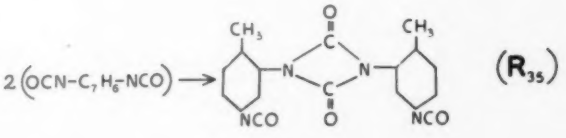
In Japan, paper treated with a polyurethane prepared from 4,4′-biphenylenedimethylene diisocyanate and castor oil, or hydroxylated soya oil, has shown improved tensile strength and water resistance. (345)

Polymerization

Polymerization is a general reaction of the isocyanates; several catalysts have been used to bring about various degrees of polymerization. In the presence of triethyl phosphine, most aromatic isocyanates dimerize, presumably to a compound shown in reaction R_{34}. (75,76,77)

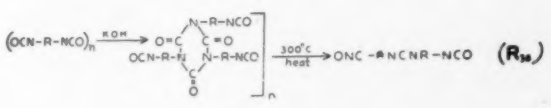


Using pyridine as the catalyst, a similar reaction occurs with diisocyanates, leading to the dimer. (78) (reaction R_{35})



This will also occur slowly on standing.

Diisocyanates can also be polymerized to the trimer, (which in turn can polymerize further.) The product splits off CO_2 at 300°C to form a modified dimer. (48,79) (Reaction R_{36})



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TESTING FUNGICIDES BY SLIDE FILM METHOD

By

Dr. Rudolf Kaden

FOR a number of years paints with fungicidal or bactericidal properties have found wide use in the protection of equipment and electronic devices. Such coatings are especially effective in tropical climates where fungi thrive. Several chemical agents are employed to impart fungicidal properties to a coating. This is accomplished by the incorporation of small amounts of the chemical agent into the paint system. However, testing the fungicidal effectiveness of such coatings is not an easy task. This article is chiefly concerned with a newly developed test method, known as the slide-film test, for evaluating the effectiveness of fungicidal coatings.

In 1950 Ruggeri was engaged in a project which was concerned with the testing of fungicidal varnishes and lacquers, particularly their effect on mold growth. He employed methods similar to the filter paper lamina test which consisted of applying the coating to a lamina and then laying it on the agar of a Petri dish. The agar was first innoculated with small mold spores. These were well distributed throughout the agar in order that the fungicidal effect on the varnish would be easily detected in the event of any inhibition of fungus growth.

Dr. Kaden is connected with the Dept. of Dermatology, Freie Universitat Berlin, Rudolf-Virchow-Krankenhaus. Prof. E. Langer, chairman.

These experiments were sponsored through ERP —Research Funds.

Those engaged in fungicidal studies of coating materials are constantly confronted with the problem of determining the effectiveness of a particular chemical in inhibiting fungus growth.

The technique described in this article is considered by the author to be a reliable method. On the other hand it is conceivable that other technologists may not agree with some phases of this technique such as the type of fungus used in the study, temperature and humidity conditions, length of incubation time, etc.

However, the presentation of this article is intended to keep American paint technologists informed of some of the more recent foreign developments in the field of fungicides.

THE EDITOR

Technique of Slide-Film Test.

The slide-film test which was developed by Langer and Kaden (1954) is a comparatively easy and quick method.

First the lacquer or paint is applied in a strip, approximately 5 mm. wide, across a slide (see Fig. 1). After drying for 2 hours, a film is formed which compares with the thin veneer of a nail polish or wall paint. A melted agar, containing spores of fungi is then applied with the aid of a pipette to two parallel strips and allowed to stand. It is necessary for the agar to be liquid (accomplished by heating), but the temperature must not exceed 60°C, when the fungus is added, otherwise the spores in the agar may be destroyed by excessive heat. The slide is then put into a moist chamber, so that the growth of fungi can develop under favorable conditions. It is known that damp and warmth favor the growth of pathogenic fungi and molds in nature. Penicillium glaucum is very suitable as a test fungus, since it gives quick and accurate results, due to its speedy growth. After 6 days, growth is considered complete and the results may be recorded. The white mycelium represents the growth of the fungus, and the dark areas the inhibition of growth. The differences in growth may be easily read and photographed (slides are illuminated from the side).

By this method all film-forming materials such as lacquers, varnishes and paints may be examined and tested for their effect on fungi. The slide-film test gives a fine differentiation of the inhibitory effects of the products examined. It is possible to distinguish three degrees of inhibition:

1. *Complete inhibition with a far-reaching effect*, which does not allow growth of the fungus in the region of the strip and adjoining areas (Prep. 304);
2. *Complete inhibition* showing absence of fungus confined

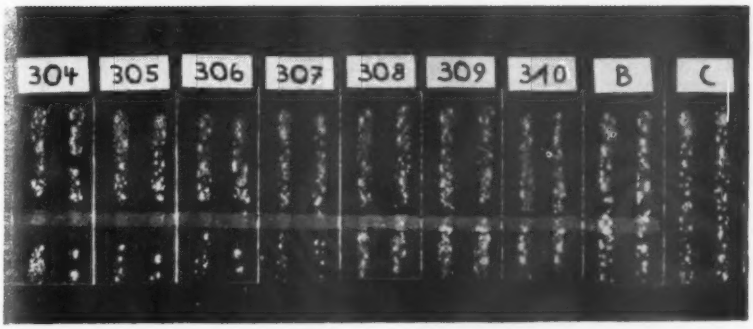

Figure 1. Slide film test after 6-day incubation. Growth inhibition of penicillium glaucum by lacquer preparation 304 and diminishing concentrations. The lacquer strips consist of the following materials and concentrations: 304-Lacquer prep. 304, 305-1/2 conc., 306-1/4 conc., 307-1/8 conc., 308-1/16 conc., 309-1/32 conc., 310-1/64 conc., B-Fungicide free lacquer, C-Blank control no film strip.

to the area of the strip (Prep. 308);

3. *Partial inhibition*, which permits slight growth of fungus colonies in the area of the strip, as in the case of Prep. 310.

Complete ineffectiveness of the agent allows the test fungus to grow uninhibited in the region of the strip, as is also the case in ordinary preparations with no special additions of fungicides.

Apart from microscopic examination, an early microscopic reading of results is possible after 36 to 48 hours.

By means of the degree of inhibition, the slide film test will give quantitative results on the concentration of the effective agent in the lacquer or paint. Figure 1 shows the gradual increase in growth when there is a decrease in concentration of the fungicidal agent. The concentration of the effective agent in the lacquer strip is halved with each preparation, until with Prep. 310 it measures only 1/64. As always, Prep. B is the lacquer base, which in this case consists of a nail polish suitable for the skin, and C is the control. It is thus possible to determine quantitatively, by comparison, an unknown concentration of a fungicidal preparation.

Qualitative Estimation

On the other hand, it is possible that fungicide concentration may remain constant and the lacquer base changed from time to time. Figure 2 shows the relationship between special test preparations of different types of lacquer bases.* The lacquer strips in the left-hand series of slides consist of the fungicide-free bases.

Prep. B3 is the lacquer base for prep. 304. Prep. 304, is used as antimycotic remedy for the treatment of fungus diseases of the skin and nails, and it is identical with "Mykotektan." Its lacquer base being without any fungicidal addition shows no inhibitory effect as one would expect. The other types of lacquer bases from the series of oil varnishes, lacquers on a poly-

*The author acknowledges the cooperation of Dr. Zeidler, Head of the Lacquer and Paint Research Laboratory, Berlin, Germany for preparing the test samples used in this study.

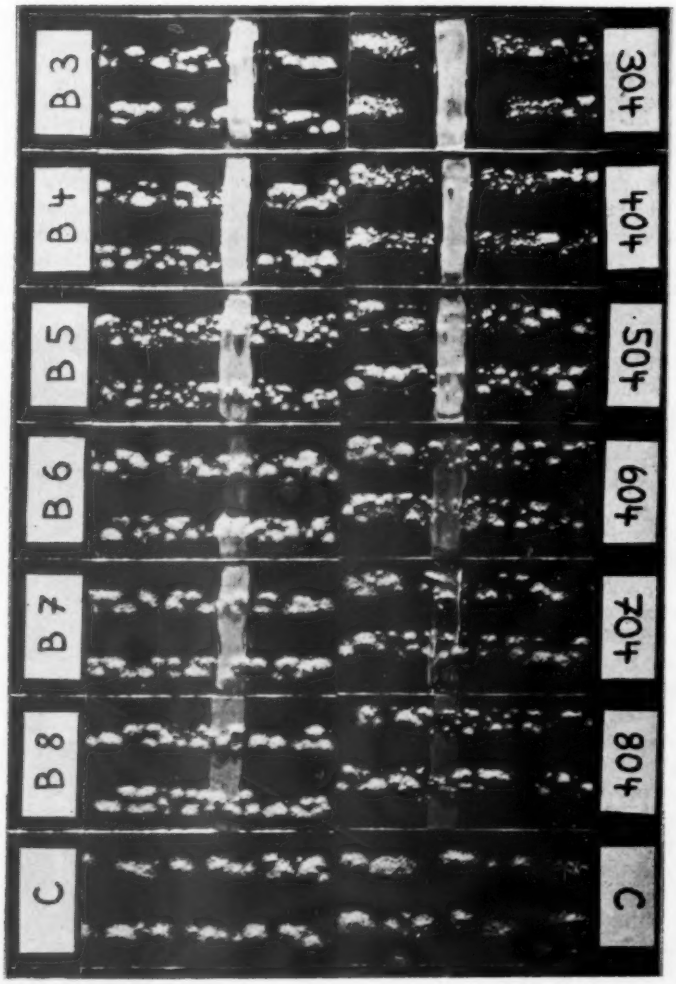

Figure 2. Comparative effect of different types of lacquer with and without fungicidal addition. Series on left: lacquers without fungicides. Series on right: lacquer preparations with same fungicidal content. C: blank control.

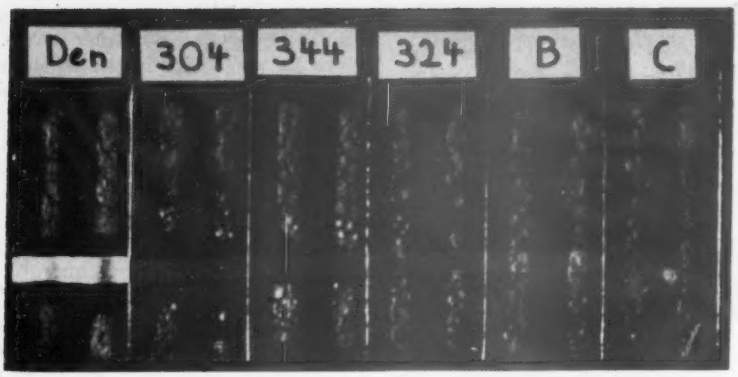

Figure 3. Preparation 304 and Dentolite show good inhibitory effects as compared to weaker preparations after 6-day incubation. lacquer strips consist of the following material: Dentolite 304, 344. 324: lacquer preparations with effective chemical agents.

mer basis, nitrocellulose and chlorinated rubber lacquers likewise exhibit no influence on fungus growth, with the exception of prep. B4, a oil varnish, is able to exert a partial inhibition. On the right-hand series of slides are lacquers containing a constant concentration of fungicide.

Only prep. 304 shows satisfactory inhibition, in contrast to the other preparations, which exert only a partial (prep. 604) or lack of (prep. 804) inhibition of fungus growth even after 6 days, despite the addition of equal concentrations of fungicide.

Comparison with Other Additives

It is acknowledged that fungicidal lacquers and paints have been used commercially abroad for a long time, more widely than in Germany. It is of interest to compare the degree of inhibition of prep. 304 with other products available. In figure 3 prep. 304 is compared with an English self-sterilizing paint, and the extent of its inhibitory effect illustrates practically equal result against fungus growth. It is interesting to note the decrease in effectiveness of preparations 344 and 324, in which only a slight chemical change of the effective agent seems to exert an unfavorable influence on the quality of the effective strength.

Mechanism Involved

The fact that a fungicidal paint or preparation can still have a fungicidal effect on its environment, even after being dried, is very surprising. In order to clarify the mechanism involved, further tests were undertaken on the fungicidal preparation 304. Figure 4 shows the arrangement of the preparations, as they are kept in a moist chamber. A space of at least 3 mm, is left between each slide, the upper series represents the growth ratios after 6 days, and the lower after 20 days. The two middle slides have lacquer strips with fungicidal prep. 304, the outer slides being without strips. A marked inhibition of fungus growth was evident, after 6 days not only on prep. 304 but also on the neighboring controls. After another fortnight, the fungus-inhibiting effect of the lacquer had diminished considerably. The white mycelium formation had grown inwardly from the periphery and diminished the area of inhibition considerably around the fungicidal lacquer strip.

The initial inhibitory effect has spread over the gaps between the slides, which can only be attributed to a gaseous effect, and not to direct contact. The frequently mentioned contact effect in similar fungicidal or bactericidal paints cannot have played a decisive part in prep. 304 in inhibiting fungus growth.

Despite the properties desired of these new special preparations—to have a destructive effect on fungus spores—the quality of the lacquers and paints must remain good, so that they can fulfill their role. A vital factor is the suitability of the effective agent for incorporation into a lacquer or paint. Here it is

(*Turn to page 66*)

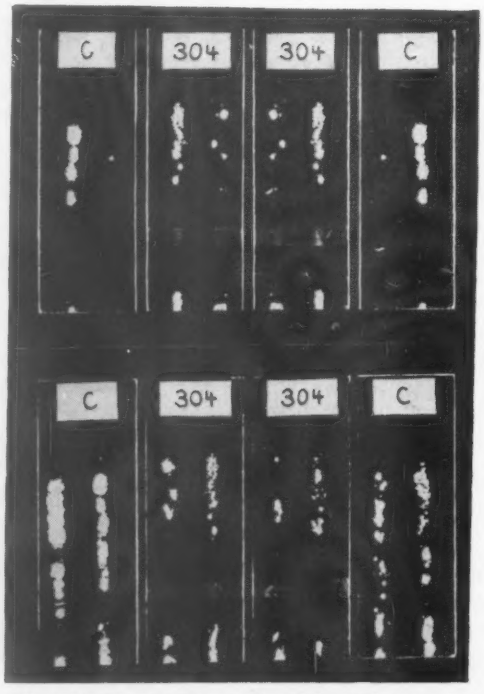

Figure 4. Upper series: after 6 days of intensive inhibition fungus growth takes place on prep. 304 including the blank controls (C). Lower series: after 20 days considerable weakening of inhibitory effect is evident.

NONDRYING ALKYDS FROM TALLOW ACIDS

By
R. F. Schwartz*
G. A. Lutz
Battelle Memorial Institute

THE purpose of this article is to acquaint the coatings and vehicle industry with the potentiality of tallow fatty acids as a raw material in the formulation of nondrying alkyd resins. These alkyds are produced from non-drying oils and acids such as coconut, cottonseed and castor, either alone or in combination, and are generally of the medium short oil glycerol phthalate type.

Nondrying alkyds are widely used in the formulation of the following types of finishes:

1. Nitrocellulose lacquers
   - A. Automotive topcoats
   - B. Water white furniture and wood lacquers

II. Baking Enamels with Urea or Melamine Resins
   - A. General Appliance finishes
   - B. Refrigerator finishes
   - C. Washing Machine finishes
   - D. Heat-resistant finishes

The preceding examples indicate that nondrying alkyds are important components of a number of industrial finishes.

Although the alkyd resin produced was investigated only in black and white automotive lacquer topcoats, there is reason to believe that nondrying alkyds from tallow acids deserve study in the other uses mentioned. This consideration would become especially important if a stable and competitive price of tallow could be established.

The tallow acids that were used in the preparation of the alkyds were obtained by the saponification of bleachable tallow with sodium hydroxide solution, conversion of the soaps to the free fatty acids by acidification with sulfuric acid, and vacuum distillation of the free tallow acids in glass equipment and in a nitrogen atmosphere. The distilled fatty acids had the following properties:

Titer	44
Iodine Value	53
Acid Value	204
Color (Gardner Scale)	3+

The composition and conditions for the preparation of the alkyd resin and the lacquer were as follows:

Composition	*Weight, per cent*
Tallow Fatty Acids, distilled	35.8
Glycerine, 100 per cent	25.2
Phthalic Anhydride	38.0
Fumaric Acid	1.0

The temperature of the alkyd ingredients was raised to 425° F. over a period of four hours and kept at 425° F. until the viscosity of the mixture was X to Y at 60 per cent N V M in toluene. Total time was 7 hours. At this stage the mixture was cooled to 380° F. and diluted to 60 per cent N V M in toluene. Color (Gardner Scale) was 2+. This color compared quite favorably with proprietary alkyds of a similar type. In diluting the lacquers to a viscosity that was suitable for spraying purposes, it was observed that the tallow alkyd lacquer tolerated a lower viscosity at higher solids than did the control.

Six six-inch by twelve-inch clean steel panels were sprayed with thinned automotive primer (Ferbert Schorndorfer) and baked for 20 minutes at 375° F. The primed panels were sprayed with black lacquer to a film thickness of about 3 mil and then baked for 30 minutes at 190° F. Gloss at 60° angle on the unbuffed lacquered panels was 33; under similar conditions the control read 37. Sanding properties of the tallow alkyd lacquer and the control were similar. After buffing, the tallow alkyd lacquer showed a 60° angular gloss of 89, the corresponding value for the control was 83. Patching properties of the tallow alkyd lacquers were slightly better than those of the control.

Panels for Florida exposure of the white tallow alkyds were prepared by coating steel panels with an industrial primer (Ferbert Schorndorfer) and baking 20 minutes at 375° F. The base solution of the white tallow alkyd lacquers was thinned to 30 seconds (No. 4 Ford Cup) and sprayed on the panels at 60 p.s.i. Thickness of the primer averaged 1 to 1.5 mil, thickness of the primer plus the lacquer, 2.5 to 4 mil.

Although the Florida exposure tests are incomplete,

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*Present address: American Zinc Sales Company, Columbus, Ohio.

HIGHLIGHTS OF 33rd FEDERATION MEETING

Overflowing registration for 3-day meeting which topped 3,650.

FOR the first time, New York was the scene of the 33rd Annual Meeting of the Federation of Paint and Varnish Production Clubs and the Paint Industries' Show. Both events, held at the Hotel Statler during October 2-5th, attracted some 3,650 paint technologists from all parts of the United States, Canada, and several foreign countries.

Pres. Beckwith's Report

"The young men moving up to lead the Federation in the future all share an unselfish devotion to the profession and an anxiety for an even greater and better Federation."

This feeling was expressed by N. P. Beckwith, retiring president, in his annual report to members of the Federation.

For the future Mr. Beckwith hoped for the Federation continued closer relationships with OCCA, FATIPEC and other paint technological organizations toward making the Tri-Alliance the ultimate goal.

In the educational field, he hoped for greater Federation activity yet in directing young people into the paint profession. Specifically he hoped more study will be given to familarizing high school science teachers with simple, but dramatic, illustrations of protective coating technology.

In the standardization of methods and test work, Mr. Beckwith asked for Federation closer contact with other technical organizations working toward a common goal of improved and simplified methods and more widespread distribution of information thereon.

In the field of research, he urged expansion in the corrosion field, working with the National Association of Corrosion Engineers and other allied organizations.

Kettering—Keynote Speaker

Dr. C. F. Kettering, research consultant to the Research Laboratories, Division of General Motors Corp., was the keynote speaker at the opening session.

In his address, he emphasized that scientific development can only be achieved by facing the future, not the past. He said —

"Most people are interested in where they came from; inventors are interested in where they are going. The difference in the point of view of the inventor is that most people think of inventors as screwballs, while inventors have their own opinion of most people."

Dr. Kettering then related to the audience his experience in trying to locate a quick-drying lacquer for automobiles. At that time, most lacquer manufacturers were of the opinion that a quick drying finish was impossible and were prone not to change their ideas of formulations. This was a case of the paint industry living in the past. The technical men, however, are trying to do a better job, he said, but the little we know is infinitesimal compared with what we don't know.

Battley of NPVLA

Joseph F. Battley, president of the National Paint, Varnish and Lacquer Association warned members of the Federation of the need of obtaining technically trained men for our industry. The situation that faces the paint industry is serious and it is being spared by every big industry in the United States. He urged that a program be developed which will insure adequate trained personnel for our industry.

President Battley emphasized the importance of paint companies to develop new products to meet the competition of the products of other industries such as plastic sheet that require no coatings, and new metals that are decorative as well as structural.

Mark — Mattiello Lecture

The seventh annual Joseph J. Mattiello Memorial Lecture was presented by Dr. Herman F. Mark, director of the Polymer Research Institute at the Polytechnic Institute of Brooklyn.

Preliminary to the discussion of the graft and block type of macromolecular structure which is the main theme of this lecture, Dr. Mark reviewed the nature of regular alternate or random type of copolymerization. In general, the macromolecular type of compositions used in surface coatings belong to the organic class consisting only of molecules built up of carbon hydrogen, oxygen, and in some of them nitrogen. In addition to which there are those polymeric materials containing halogens

such as polyvinyl chloride, Neoprene, and chlorinated rubber.

By combining into film forming compositions strong hydrogen bond accepting and weak hydrogen bond donating dipoles, such as in CO and OH or CO and NH, in proper concentrations, it is possible to combine high softening and good solvent resistance with good adhesion and mechanical properties at moderate curing temperatures. Examples of such combinations are polyamides, copolyesterpolyamides, polyester-epoxy, and similar materials. Yet certain desirable properties are still lacking and disadvantages such as brittleness at low temperatures are present.

Introduction of fluorine and of silicon into the architecture of the polymer leads to the attainment of certain very desirable properties such as increased resistance to temperature fluctuations, high degrees of chemical resistance, etc. Polychlorofluroethylene and polyvinylfluoride and the fluorinated polyacrylates are examples of the use of fluorine.

New Principles of Macromolecular Structure

In regular copolymerization reactions with both monomers present, the copolymerization takes place either alternately or at close random, like ABABABAB or ABBAAABABB combinations.

New principles involve the production of either "block" or "graft" molecular structure at the same composition ratios and degree of polymerization. Block macromolecular structures are those in which long chain molecules have a series of polymerized monomer of one kind, separated by a series of polymerized monomer of the other kind. As contrasted to the A and B combinations cited above, a block structure would consist of a molecule having perhaps 50 atoms of monomer A spaced by another 50 atoms of monomer B, like 50A—50B———50A—50B, etc. instead of the alternate or random type that occurs in regular copolymerization as cited above.

The other type is graft polymerization, in which the axial chain of the molecule is composed of one monomer, and branching from it at regular intervals are side chains of monomer B, in the macromolecular structure. The average distance between the chains can be varied and the average length of the chain can be regulated, without varying the 1:1 molar ratio of the monomers or the total degree of polymerization.

The syntheses of block or graft macromolecules in copolymeric structures offers almost unlimited combinations of properties, particularly with respect to adhesion, and surface activity or passivity. Graft copolymers or polyesters, alkyds, and epoxy resins and rubbers exhibit very interesting laminating characteristics and are one of the most rapidly expanding species of constructional plastics.

Safety Panel. L to R: J. Houghton, Liberty Mutual Insurance Co.; S. Danoff, Midland Industrial Finishes; F. Gaugush, Sherwin-Williams Co.; G. Cain, Hercules Powder Co.; T. O'Connor, Great Lakes Solvents, Inc.

Nuclear Radiation in High Polymer Chemistry

Nuclear radiation of organic polymers produces a variety of free radicals in the polymer or copolymer which set off three different types of secondary reactions:

1. Chemical crosslinking of adjacent chains.
2. Establishment of double bonds in the individual chains.
3. Scission of the individual chains.

Such radiations have very interesting effects on certain macromolecular structures. For example, polyethylene which normally has a melting point of around 110°C, can be made to melt only above 130°C and become insoluble in all solvents even at elevated temperatures.

"Colonel" Billy Hood holding open forum meeting on technical problems.

Student Session

A student-session was held during Monday afternoon, October 3rd.

Dr. L. A. Martin of the Educational Committee discussed in detail the high school program which is expected to get underway this fall. Dr. Martin pointed out that the basic objectives of this program is to interest and encourage high school students to major in chemistry or chemical engineering. Plans also call for sending 12 high school chemistry teachers to one of the summer short courses at North Dakota State Agricultural College in 1956.

Research Committee

A report covering the research activities of the Federation was given by C. G. Moore.

Current projects include "Film Structure" by the Cleveland Club in collaboration with Case Institute; "Illumination for Color Matching" by the Philadelphia Club; "Light Screening" by the Pacific Northwest Club; "Adhesion Studies" by the University of Louisville under the direction of Dr. J. S. Long.

Projects to be started include a graduate fellowship at Case Institute for the study of "Spectroscopic Methods in Paint Vehicles" and the "Investigation of Caros' Acid as a Tool in the Analysis of Paint Vehicles" by Grant for Xavier University in collaboration with the CDIC Club.

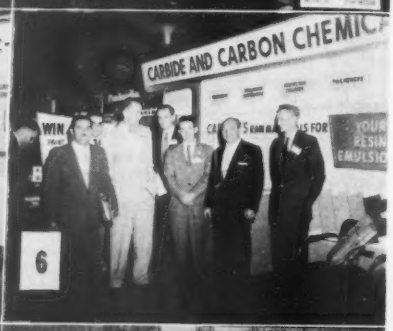
Mr. Moore appealed for the development of a series of projects which would be suitable for educational institutions in the areas of various clubs.

Emulsion Panel

An overflowing audience was on hand for the panel discussion on emulsion paints held Tuesday morning, October 4th. The moderator of the panel was Benjamin Farber of Farnow Varnish

(*Turn to page 68*)

CANDID SHOTS OF PAINT INDUSTRIES' SHOW



1—M. Keane, L. Wizeman, J. J. Reed, M. Rhodes—Nat'l Aniline. 2—J. Frankel, A. Baracani—Advance Solvents, J. Novratil—Relac, T. Brioux—Advance Solvents, D. Everett—Van Horn Metz. 3—P. Marston, A. Olge—Anders Chemical, H. Hockmeyer—Herman Hockmeyer, F. Collins—Hy-R-Speed, S. Klein—Herman Hockmeyer. 4—J. Gagnier, R. Buller, F. Swackhamer—Shell Chemical. 5—R. Caldwell—Calif. Stucco Products of New England, H. Cheetham, M. Wight, F. Wilkinson—Rohm & Haas. 6—H. Rubenstein—Royal Lacquer, H. Igdaloff—Plaskon, R. Duzy, A. Mitchell, K. Brown, H. Klauman—Carbide & Carbon, Sid Makon—Royal Lacquer. 7—B. Sibbold, R. Johnson—Dow Chemical. 8—H. Davis, J. Mamola—Celanese, A. Rapp—Glidden, W. Mathews—Celanese. 9—A. Thayer, P. Juley, I. Claire—C. K. Williams, W. Egge—Trojan Powder. 10—J. Erwin, A. Cooke, A. Luedeke—Commercial Solvents. 11—Mr. & Mrs. B. Gooel—Standard Detroit Paint Co., J. Scullin—Nuodex, E. Senick—Barrett, M. Brenner—Nuodex. 12—H. Beardsley—Du Pont, L. and W. Minkoff—Peerless Paint, C. Argana—Du Pont. 13—C. Dittman—J. M. Lehmann, F. Spohrer—Eagle Paint, J. Sarlat, C. Page—J. M. Lehmann, F. Pierce—Eagle Paint. 14—B. Wilkes—J. C. Ackerman, O. Hempel, H. Smith—Minerals & Chemicals, J. Zola—John C. Zola Lab. 15—O. Paukner—ADM, L. Thompson—Firestone, W. Manko—Krumbhaar, W. Burns—Velsicol, E. Vesely—ADM.

CANDID SHOTS OF PAINT INDUSTRIES' SHOW

1—B. Krashin, A. Newell, J. Ames—Colton Chemical. 2—J. Platner, R. Barnum, J. Houlette, A. Polson—Goodyear Chemical. 3—H. Hillman—Eagle Paint, S. Smith, C. Ambrose, Jr., J. Styba, T. Dunn—C. M. Ambrose. 4—J. Peters, S. Whitehead, G. Veder, F. Weitzner—Kent Machine; H. Wolf—Alma Paint. 5—J. Sodarno—Nat'l. Manufacturing, C. Spiegle, T. Zack—Reichhold. 6—R. Rowe, C. Geiser, F. Demme, T. Davidge—Sharples Chemical. 7—C. Kocik, R. Keating, R. Loges—Columbian Carbon. 8—R. Terrill, D. McCready—Spencer Kellogg, M. Merritt—Empire State Varnish, D. Healy—Spencer Kellogg, T. Aalto—Heyden Chemical. 9—J. Taylor, D. Grubbs—Morehouse-Cowles, H. Avrowchenko, J. Roberts—Peerless Paint. 10—O. Heuer—Glidden, C. Smith, J. Lawton—T. F. Washburn. 11—M. Inles, E. Singer—Troy Chemical, H. Cahn—General Electric, M. Sockloff—Flamingo Research Lab. 12—J Telsby, L. Ross, C. Ross—Charles Ross & Son. 13—O. Fleisher—Bedford Chemical Sales, I. Ash—Baker Castor, J. Fleisher—Continental Lacquer. 14—J. Sackis, C. Grubb, W. Twombley, P. Prewitt, W. Walker—Witco. 15—J. Been—Rubber & Asbestos Corp., B. Bresky, L. Conklin, Jr.—R-B-H, A. Chenick—Standard Coating Products Inc., G. Gable—Perfection Paint.

CANDID SHOTS OF PAINT INDUSTRIES' SHOW

1—H. Le Pan—Bennett, F. Moore—Frost Paint & Oil, L. Kelley—Drake Paint, R. Steinert—Bennett. 2—P. Serconi, W. Grupe, Mrs. P. Serconi, G. Miller—Cuno. 3—D. Smith—Lilly Varnish, G. Wells, R. Calsibet, C. Droman—Bakelite. 4—A. Stratton—Precision Scientific, R. Henley, S. Hollis, Pennsylvania Industrial, R. Ozmek—Nat'l Aniline. 5—F. Burns—Nuodex. 6—A. Giordano, A. Molinari—Harshaw. 7—J. Villing, R. Lauderbaugh, E. Isenberg—Neville. 8—G. Taube—Chilton Paint, J. Kamen—Cargill, P. Blackmore—Interchemical, S. Garnett—Cargill. 9—A. Applegate, G. McTavey, J. C. Smith—Naftone. 10—D. Klein, E. Barkley, T. Aalto, W. Deakyne—Heyden Chemical. 11—F. Hollenberg—Lacquer Products, C. Kew—Kinetic Dispersion, A. Tendler—Synn-Mur Paint. 12—S. Farber—Farnow, H. Mackie—Federal Paint, H. Kristeller, A. Saputo—Farnow. 13—B. Fink, E. Scofield—Nat'l. Starch, J. Heckel—R. T. Vanderbilt, A. Holmer, W. Thompson—Titanium Pigment. 14—J. Arthur, T. Campbell, I. Wojcik, F. Leonard—Nopco. 15—W. Roemelt, S. Copithorne, F. Browning, F. Carpenter—Godfrey L. Cabot.

CANDID SHOTS OF PAINT INDUSTRIES' SHOW

1—J. Langner—Hilton-Davis, H. Krause—Marvelite Paint. 2—B. Alport, J. Norton—Atlas Electric. 3—E. Brasington, H. Herrington, J. Parsons, W. Harrigan—Troy Engine & Machine. 4—A. Anderson—Passonno Corp., D. Steinberg—Alsamite Paint, J. Sharbaughl, G. Garland—Sparkler, A. Steinberg—Alsamite Paint. 5—D. Elliott, C. Kruse, W. Hilty, J. McAuley—Ross & Rowe, R. Freeman—R. T. Freeman. 6—B. Porter—Shawinigan, E. Ross—T. C. Ashley, H. Terry, B. Brill, V. Birten—Shawinigan. 7—C. Eick—Arizona, E. Calleton—National Southern Products, P. Patuck—West Virginia Pulp & Paper. 8—R. Shelly—Eastman Chemical, J. Allderdice—General Mills, J. Langston, R. Moore—Eastman Chemical. 9—G. Harvey, W. Abbott—Atlas Powder, C. Coney—Eastman Chemical. 10—H. Farkas, O. Gomoll—U. S. Stoneware. 11—J. Diltz, R. Schmitt—J. H. Day, H. Underweiser, F. Weinberger—Arrow Lacquer, R. Mader—J. H. Day. 12—J. Zegebone—A. C. Horn, E. MacPherson, R. Green, A. Goodacre—Monsanto. 13—W. Stitt-Buckman Laboratories, R. Evans—Master Mechanics, J. Sharpley—Buckman. 14—W. Madden-Firestone, E. Miller—Research Coatings Co., T. Henry—Firestone. 15—J. DeGroot—Armstrong Cork, R. Stover, W. Holmes—Hercules Powder.

HIGHLIGHTS OF 67th NPVLA CONVENTION

SOME 1500 members of the paint industry met in Washington October 31, November 1 and 2 for the 67th annual convention of the National Paint, Varnish and Lacquer Association.

"Color Comes to Washington" was the theme of this year's convention and the general sessions were highlighted by prominent speakers from government and industry. Included among these were the Honorable Sinclair Weeks, Sec. of Commerce, Leo M. Chern, executive director of the Research Institute of America.

Pres. J. F. Battley

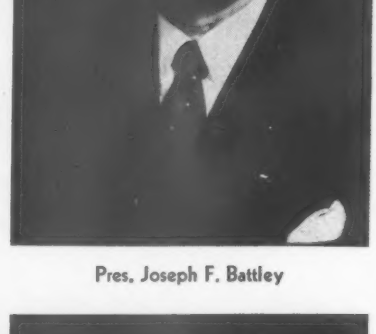
We have not been entirely remiss, but. . .in the name of candor. . .we must admit that 1955 is a bit late to be embracing consumer credit devices—the machinery for credit sales has been old stuff to the automobile industry, the housing industry, and to many others for twenty years. For some reason we have assumed that our industry is outside the ' 'Buy Now. . .Pay Monthly' ' sphere. Perhaps this stems from the fact that our business has been so good that we haven't felt the pinch. But any laxity now could turn out to be the first one of our "sleepers."

The Housing people have long known that a buyer will often settle for the inferior competitive house if his payments involve less of a headache than those required for the better house.

The vast department store industry knows that quality standards are not the whole answer to competition, that matching the credit offer of the competitor is, at times, more important. They have developed financing schemes for many other industries to a fine art . . .the "Budget Plan", the "90-Day Charge", the "Seasonal Plan", and the "Layaway" plan.

Currently we face no crisis but big changes can come fast. As an example, the high pressure credit sales of the so-called "Never-paint-again-permanent-house-coating" was a "sleeper" that we had not anticipated. If this very questionable product has been all that was claimed by its promoters and had been made by a reliable competing industry with well oiled, nation-

Pres. Joseph F. Battley



Leo M. Cherne

wide credit machinery, I suggest that we would have taken a much faster step toward installment sales to protect our markets.

Our industry's best thinkers believe that, for us, the handwriting on the wall involves bold concepts of new compounds, new synthetics, new elements from which we will build the coatings for the future. New materials will be the guarantee for our industry's progress.

I suggest that the best insurance for our own industry against sudden dislocation lies in thinking adventurously—thinking big—for developing sources —now undiscovered—materials—now unknown—for your future coatings.

Maybe the next is not a problem—nor a sleeper. A couple of years ago, when atomic physicists first came forth with the radioactive isotope, practically every major industry spotted this little "tracer" as a detective which could help them find hidden answers to unsolved problems.

The steel people were fascinated with the promise of what these little tracers might tell them about steel behavior made with varying alloys when under a dozen forms of stress. Biologists, chemists and engineers also saw a sudden promise of fresh, new answers to some of their age old questions.

Doctor Manov and Howard Gottlieb of the Bjorksten Research Laboratories saw the same promise for our industry. They drew up a list of Research problems where Isotopes might supply some of our hidden answers.

That list is impressive because of its length, impressive for the number of fields in which we can use these little "tracers".

Here are only a few:

Diffusion of sea water through marine paints.
Determining trace impurities in paint ingredients.
Settling of paint in storage.
Measuring thickness of paint film.
Measuring the mechanical wear of paint and varnish coatings.
Determining the cleanliness of a metal surface prior to painting.
Role of driers in paint.
Use of isotopes in place of radium in luminous paints.

It is on this note that I say "Thank You" for your usual outstanding cooperation and splendid support, and to wish you the best of good times while you are visiting in Washington. I look forward to a year hence when we meet and again record our further

progress to a two billion dollar industry.

Sec. Sinclair Weeks

The Honorable Sinclair Weeks, Secretary of Commerce was the principal speaker at the General Session on Monday, Oct. 31, 1955. Here are a few important remarks by Sec. Weeks.

On February 12, 1953, about a month after I became Secretary of Commerce, I made my *first* public statement. It was a sort of declaration of faith—and ever since we have tried to keep that faith. I said, and I quote:

"This Administration has unquenchable confidence in the long-haul power of free enterprise.

"We plan to give business—which means workers, investors, and management dependent on business for a livelihood—a greater chance to earn more money for themselves.

"We dare take a chance on responsible freedom. We are not afraid to trust free enterprise to be enterprising."

I sincerely believe that this Administration has kept that promise, and that today private enterprise operates in the most favorable environment in which it has ever operated. The record shows that the American people can and are earning "more money for themselves"—*more* than any people on earth—*more* than at any other time in history. And they are earning stabilized not inflated dollars.

Today we have a peaceful prosperity greater than at any time in history. Since 1952 employment has risen from 61.3 to 64.7 million. Our gross national product has increased $46.8 billion and personal income $23.9 billion during the last three years.

A recent check with the Business Advisory Council indicates that the first six months of 1956 should continue this same trend. In general this is true for both sales and capital expenditures.

These brief statistics are evidence that our economy has been moving forward in the last few years.

Eisenhower prosperity did not just happen by accident. It is not the result of inflation of war boom. It is sound, healthy, and dynamic.

In my opinion, we are enjoying unprecedented prosperity because—as I declared at the very start of my public service in the speech I quoted earlier—" This Administration has unquenchable confidence in the long-haul power of free enterprise."

We have confidence in our free system. The American people have confidence in that system and confidence in President Eisenhower. And from this widespread confidence stems the willingness to use that system to

Hon. Sinclair Weeks

expand prosperity and to develop economic growth.

Industrial Finishes Forum

"Creative Thinking" was the theme of the Industrial Product Finishes Div. meeting held at the Tuesday, November 1st, Morning Session. Presiding was Joseph A. Hager.

Willard Pleuthner of the Creative Education Foundation presented a most enlightening talk on developing the creative imagination or how to get more ideas.

The mind has four functions—absorptive, retentive, reasoning and creative.

In the development of an idea, there are seven steps: orientation, preparation, analysis, ideation, incubation, synthesis and evaluation.

Trade Sales Forum

The Trade Sales Manufacturers' Forum attracted a overflowing audience, since this year's theme was "Increasing Trade Sales Volume."

Three speakers presented valuable recommendation plans that could help materially in building more sales.

Chet A. Watkins, Pres. of Retail Paint and Wall paper Distributors of America spoke on the subject, "How Manufacturers Can Best Help Retailers." Excerpt from his talk are—

Not too many years ago the typical paint store was a rather dismal shop with the smell of turpentine and linseed oil very much in evidence. These two staples were carried in drums from which the customer's jugs, cans or bottles were filled—and many times the cork was an old corncob. In those days, color systems consisted of a colorcard showing a breakdown of the colors in oil. But we had a great deal more time then to mix all these things together and wait for the paints and varnishes to dry.

In those days, many dealers showed a great resistance to any change. Some still do. But great changes have been made since then, especially in the past few years, and the dealer who has been resisting change is generally the dealer who has fallen behind and has not increased his volume and his profits. We feel that RPWDA has pioneered for the dealer in keeping its members alert to new thinking, new ideas, new plans—it has contributed to the modernization of the industry by keeping us informed.

Let's look at the changes which have spelled more volume. RPWDA business surveys over the past few years show that the retailer whose trend in sales is upward is doing the following things:

1. He is modernizing his store and getting away from the oil and turpentine drum type of operation.
2. He is setting an example for his customers by more frequent decoration of his store.
3. He is advertising and pushing the fact that he is selling decorations and color and not just so much paint in tin cans.
4. He is adopting more dramatic or effective promotions.
5. He is using more direct mail advertising.
6. He is putting salespeople outside calling on more customers instead of waiting for the customer to call on him.
7. He is adding related lines or departments such as window shades, picture frames, artist materials, unfinished furniture, wallpaper, draperies and many others in an effort to increase store traffic which in turn stimulates paint sales.

I have had occasion to travel around a lot in the past year or two and I've visited stores in practically every area of the country. I have talked to the owners—heard their problems and have seen the strong and the weak points of their operations. Based on this informal survey and my own experience, I would like to cite five outstanding needs in the retail segment of our industry today—factors which we should consider together. These five elements are the weaknesses usually of the borderline or failing dealer—and the accomplishments of the successful operators.

First, there is the problem of stock or inventory control. It is amazing how many dealers are trying to do business without any semblance of an inventory system and, as a result, most of these dealers are either out of

(Turn to page 85)

NEWS

Epoxidation Discussed At. N. Y. Vehicle Meeting

A paper on the "Investigation of Some Epoxy Esters as Plasticizers and Stabilizers for Polyvinyl Chloride," was presented by Dr. Daniel Swern last month at the meeting of the N.Y. Vehicle Manufacturers Group. Sixty-five members attended.

Dr. Swern is associated with the Eastern Utilization Research Branch in Philadelphia.

A movie on Petrochemicals was also presented.

Dr. Swern said in substance that approximately thirty-two epoxy esters have been prepared from fats and have been evaluated as plasticizers and stabilizers for polyvinyl chloride resins.

A new class of all-purpose primary plasticizers, namely, epoxidized diacetomonoglycerides, has been prepared and evaluated.

With respect to low temperature characteristics and efficiency, outstanding compounds are 2-ethylbutyl epoxystearate, epoxidized butyl esters of tall oil, methoxyethyl epoxystearate, acetoxyethyl epoxystearate, glycidyl epoxystearate, tetrahydrofurfuryl epoxystearate, cyclohexyl epoxystearates, phenyl epoxystearate, and benzyl epoxystearate.

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New Company To Handle Varied Aerosol Problems

A new company offering consulting, research and testing services on a broad range of aerosol problems, has been formed as the Aerosol Process Co.

President of the company is Winston H. Reed, formerly in charge of aerosol propellent research for the Bridgeport Brass Co. Mr. Reed has extensive experience in the field and patents pending on propellents now in commercial use.

The company's laboratory and offices are at 212 Grove St., Bridgeport 5, Conn.

The Informal Industry Advisory Committee on Protective Coatings which met recently at Spencer Kellogg and Sons Research Center, Cheektowage, N.Y. Pictured above are (l to r) Dr. George A. O'Hare, Congoleum-Nairn, Inc.; Dudley T. Moore, Emery Industries, Inc.; Jack Greenfield, National Tung Oil Marketing Cooperative, Inc.; Dr. Leo Goldblatt, Southern Regional Research Laboratory, USDA; W. A. Gloger, National Lead Co.; J. B. Bullitt, E. I. DuPont de Nemours & Co.; Francis Scofield, National Paint Varnish and Lacquer Ass'n., chairman of the committee; John P. Harner, The Glidden Co.; Dr. C. A. Knauss, Reichhold Chemical Co.; Don S. Bolley, Baker Caster Oil Co.; and R. L. Terrill, Spencer Kellogg and Sons, Inc. Committee members not pictured are W. H. Lutz, Pratt and Lambert Inc.; Waldo C. Ault, Eastern Utilization Research Branch, USDA; and Howard M. Teeter, Northern Utilization Research Branch.

Titanium Ore Deposits Found by National Lead

Titanium ore reserves of National Lead Co. have been strongly supplemented recently by the discovery of large new deposits at its properties in Tahawus, Essex County, N. Y., and in Norway, and by the purchase of large tracts of titanium-bearing land in north central Florida, Joseph A. Martino, president, has announced.

The discovery in New York State is within 1½ miles of the existing plant at Tawhawus where 5,000 tons per day of titanium ore is currently being treated and from which 300,000 tons per year of titanium mineral ilmenite is produced. Complete evaluation of this new ore occurrence has not yet been made. However, reserves of 50,000,000 tons have been proven to date and indications are that the new ore body will contain more than 100,000,000 tons. This newly discovered ore is somewhat richer in grade than the ore now being mined.

The discoveries in Norway are within four miles of the company's present titanium mining operations near Sokndal and three miles from the shipping port in Jossingfjord in southern Norway. The deposit is known to extend over one mile in length and to average about 500 feet in width and has been proven by diamond drilling to extend to as far as 1,000 feet in depth.

The Florida reserves are expected to produce about 5,000,000 tons of ilmenite concentrates from some 270,000,000 tons of sands available for economic processing.

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Plant Capacity Increase

Work is expected to start soon on a $3,500,000 capacity increase to the Goodyear Tire & Rubber Company's "Chemigum" and resin plant in Akron, Ohio, which will double the plant's present capacity for production of nitrile rubbers and latices.

The plant, part of a $100,000,000 expansion program recently announced, will supply the growing demand for "Chemigum" rubbers and latices used by the paint, paper, textile, and rubber industries, according to Herman R. Thies, general manager of the Chemical Division.

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Atomic Research Center

The first of three major units in Battelle Memorial Institute's new atomic energy research center in Columbus, Ohio, has just been completed.

NEWS

H. F. Payne

H. F. Payne Retires From American Cyanamid Co.

Henry Fleming Payne has retired from American Cyanamid Co. to become Research Professor in charge of instruction and research on Organic Coatings in the Department of Chemical Engineering at the University of Florida, Gainesville, Fla.

Mr. Payne's career spans more than 30 years in the paint and related industries. He has been with Cyanamid for 18 years, part of which was at the Stamford Laboratories in charge of the resin evaluation group, and more recently in the New York Office in connection with sales promotion and public relations. In addition, he has been in charge of courses on Organic Coating Technology in the Graduate Evening School of the Polytechnic Institute of Brooklyn, N.Y., for the past ten years.

He is author of *Organic Coating Technology*, Vol. I on "Oils, Resins, Varnishes and High Polymers."

Mr. Payne has developed two instruments which are used in paint testing and evaluation—the "Payne Permeability Cup" and the "Fischer-Payne Dip-Coater." In 1952 he was honored by the New York Paint and Varnish Production Club by presentation of the "PaVac Award" in recognition of his outstanding contributions to the organic coating industry.

FOREIGN VISITORS: A group of European paint manufacturers, looking for better sales and distribution techniques, recently visited the Hooker Glass & Paint Mfg. Co. under the guidance of the U. S. Department of Agriculture. Listening to a review of Hooker's sales program are (l to r) K. B. Westholm, Sweden; T. J. Blehr, Norway; E. L. Jorgenson, Denmark; L. L. Degefors, Sweden; and Arthur Dole, Jr., president of Hooker.

Say "Flushed" Colors Open "New Era" for Industry

A "new era" has opened for the paint manufacturing industry with the growing utilization of "flushed" pigments in tinting industrial and household finishes, the Pittsburgh Paint and Varnish Production Club was told last month.

The group heard Joseph A. Langner, representing the Hilton-Davis Chemical Co., Cincinnati, refer to flushed colors as a "most significant advance in paint-making." In addition to manufacturing economies, the technique produces pigments with a "strength, gloss and sharpness never before attained," he said.

Principal advantage of flushing, Mr. Langner explained, is its ability to carry the individual pigment particle, surrounded by water, from its original finely divided state into the vehicle, or oil, phase without destroying its minute, uniform size. No grinding of pigments is needed as in the case of dry colors, which have been used for decades in making paints.

"Because the dispersion of pigments is finer by flushing than can normally be done through grinding, the result is greater strength, higher gloss in finished enamels and much cleaner, sharper colors," Mr. Langner said.

The flushing process finds its widest application in paints used on automobiles "due to the higher gloss they provide," the meeting was told.

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Scientists Get Award For Fats and Oils Research

A Department Superior Service Award plaque has been presented to a group of scientists at the Southern Utilization Research Branch of the U.S. Department of Agriculture.

The award was made in recognition of work done in the development of new and highly improved methods of analysis of vital importance to research on new and expanded uses for fats and oils. It was presented by Secretary of Agriculture Ezra Taft Benson at the Branch in New Orleans, La.

Members of the group were Miss Dorothy C. Heinzelman, Dr. Ralph W. Planck, Frank G. Dollear, Franck C. Pack, and Robert T. O'Connor.

Announcement of the group award was made earlier in the year. At the same time individual Superior Service Awards were announced for four other members of the Southern Utilization Research Branch staff: Dr. A. M. Altschul, Dr. Evald L. Skau, Dr. F. H. Thurber, Walter A. Pons, Jr., and C. A. Fort.

NEWS

New Research Center To Be Multi-Million $ Project

Plans for the construction in Des Plaines, Ill., of a multi-million-dollar research center—conceived as one of the most highly diversified establishments for technological advancement in the country—have been announced by Roy C. Ingersoll, president of Borg-Warner Corp.

Construction of the first unit of the research center has already been started.

Pointing out that this will be a multi-purpose scientific and engineering operation, Mr. Ingersoll said the new laboratory will contain facilities for metallurgical, electronic, electrical, chemical, acoustical, hydraulic, applied mechanical, physics and nuclear research.

The laboratory also will house a complete machine and model shop, a modern computation center and a large technical reference library. About 100 scientists and engineers will be engaged at the start of the operation.

The first building of the center will contain about 40,000 square feet of floor space and will form the central unit about which the entire laboratory will be built. The completed laboratory, with about 200,000 square feet of space, will consist essentially of a series of one-story units stemming from the central unit, thus making it possible to separate and localize the different research activities.

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Name Ames Chairman

Bertram F. Ames, general sales manager of Mass & Waldstein, Newark, N. J., Chicago and Los Angeles, manufacturers of lacquers, enamels, and specialty finishes, has been appointed chairman of the Industrial Product Finishes Committee of the New York Paint, Varnish & Lacquer Association.

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Open Carbon Dioxide Plant

The Liquid Carbonic Corp. has opened its new $1,500,000 carbon dioxide plant in Oakland, Calif. Its capacity will run from 50 to 60 tons of carbon dioxide daily.

New Cuban Paint Plant Affiliated With Glidden

The newest facility in the Glidden Company's group of affiliated foreign paint concerns is the ultra-modern plant of Fabrica Nacional de Pinturas, S. A., launched recently at a cost of $1,500,000 at Havana, Cuba.

President of the new company is Luis Rodriguez Feliu who is associated with several outstanding Cuban paint specialists fully experienced in all phases of paint production, research and merchandising.

The Cuban company will receive from Glidden all technical research reports and formulas as well as manufacturing, merchandising and advertising aid. In turn, Glidden will receive rights to all new paint developments evolved by Fabrica Nacional.

Lummus Gets Assignment

Construction of Pittsburgh Coke and Chemical Company's $3,000,000 phthalic anhydride plant has been awarded to the Lummus Co., New York City, it was announced by J. F. Thornton, president of Lummus—designing engineers and constructors for the petroleum and chemical industries.

Operations will begin this Fall on Neville Island, in the Ohio River below Pittsburgh.

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Barium Carbonate Plant

Opening of new barium carbonate production facilities at Coffeyville, Kan. was announced recently by S. B. Coolidge, vice president and director of auxiliaries for The Sherwin-Williams Co.

The plant was set up in conjunction with the paint firm's 80-acre lithopone, leaded zinc and zinc sulphate production installation at Coffeyville. Initially, it will produce about 7,500 tons of barium carbonate annually.

PPG Offers Scholarship

Pittsburgh Plate Glass Co. is offering for the fourth straight year its $4,000 science and engineering scholarship to an outstanding high school male senior at Mount Vernon, Ohio, it was announced by Richard B. Tucker, vice-president. Mount Vernon is the site of the company's largest window glass producing plant.

The scholarship is designed to stimulate interest and encourage talented high school students to take advantage of the unlimited opportunities in the science and engineering fields.

•

Appoint C. Withington Co.

St. Joseph Lead Co., New York City, has announced the appointment of C. Withington Co., Inc., Long Island City, N. Y., as sales representatives for free zinc oxides to the protective coatings industry in the Metropolitan New York area.

Get better paint cans and better service... *in one stroke*

Only Continental gives you the "Tripletite" can plus Tailor-Made Package Service

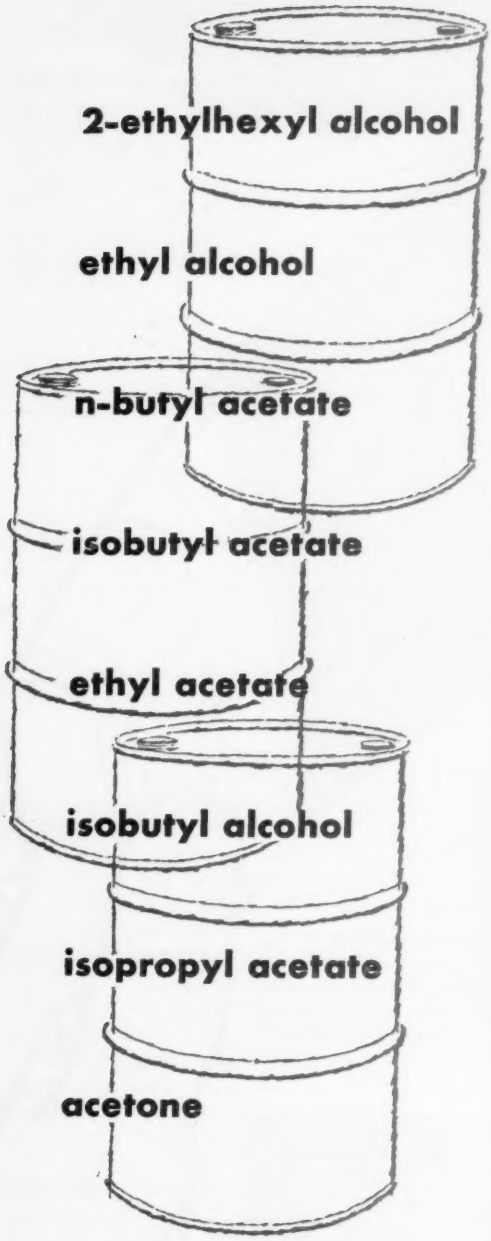
When you put your name on an order for Continental paint cans, you've signed up for both the finest containers and the finest tailor-made service. Made exclusively by Continental, the "Tripletite" lid protects your paint by binding metal to metal at three points. Continental will help protect your production schedule too, by delivering all the "Tripletite" cans you need—whenever and wherever you need them. And should you require help with research or engineering, Continental experts are always available to tailor their talents to your special needs. Why not wrap up all your paint-packaging problems with one order? Call Continental soon.

"TRIPLETITE" lid binds metal to metal at three points—provides 50% increase in guard points against oxidation and messy paint skin.

Our Fiftieth Year of Tailor-Made Packaging

CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4



Eastman solvents

These products are stored in bulk in the major industrial centers of the United States. For further information, write or call your nearest Eastman representative.

SALES OFFICES: **Eastman Chemical Products, Inc.,** Kingsport, Tenn.; New York—260 Madison Ave.; Framingham, Mass.—65 Concord St.; Cincinnati—Carew Tower; Cleveland—Terminal Tower Bldg.; Chicago—360 Michigan Ave.; Houston—412 Main St.; St. Louis—Continental Bldg. **West Coast: Wilson Meyer Co.,** San Francisco—333 Montgomery St.; Los Angeles—4800 District Blvd.; Portland—520 S. W. Sixth Ave.; Salt Lake City—73 S. Main St.; Seattle—821 Second Ave.

Eastman
CHEMICAL PRODUCTS, INC.
Kingsport, Tennessee
subsidiary of EASTMAN KODAK COMPANY

the ADM kaleidoscope

Published by
Archer-Daniels-Midland company

OCTOBER—NOVEMBER, 1955

A PROGRAM FOR SELLING THE STAIN AND BLISTER MARKET

One summer night a few years ago 40 or 50 neighbors crowded together in the living room of a neat little house in a typical mid-western housing development. These irate people were gathered together to talk about the ugly stains and paint blisters which had appeared on some 300 homes.

It would have been most illuminating for any paint manufacturer to sit in on this meeting. In the course of the evening an expert from the Forest Products Research Laboratory at Madison, Wisconsin gave a talk. He described a few of the many remedies for blistered exterior house paint.

As to mechanical remedies, he said, there are three steps commonly used, often in combination. First, to drill one inch holes between the studs on all exterior walls, just under the eaves, and insert aluminum or stainless steel louvers. Second, to staple a moisture-barrier paper beneath the floor joists. Third, when redecorating, to put two coats of aluminum paint on the plaster of all exterior walls. He also mentioned the installation of ventilating fans, and attic louvers.

As the vision of all this work and expense dawned on the home owners, there was angry murmuring. Then one harassed young husband spoke up, "But isn't there some way to lick this problem with better paint? Wouldn't that be the simplest remedy?"

This is a good question for paint makers. As fast as you can come up with a good answer you can begin to sell a large, unhappy, but lucrative market.

How To Sell This Market

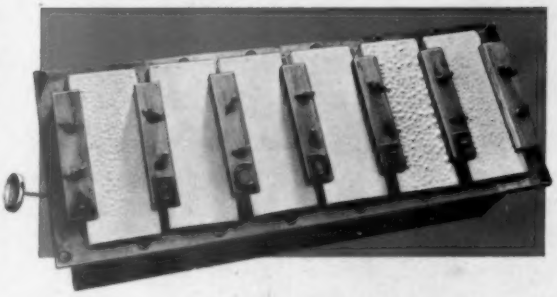
Now, let us briefly review some of the work that has been done on stain and blister resistant house paints and present a simple program for paint manufacturers who want to sell this market.

What causes paint to bubble out on a house? The answer is pretty obvious—it's moisture vapor caused by condensation, high interior humidity, seepage, or ground contact, trying to fight its way out. If the trouble is extreme, there is no other solution except the mechanical measures described. However, ordinary amounts of moisture encountered in a properly built house *can* be controlled and vented by special types of exterior paint.

What Causes Blisters?

Research has indicated that lead and zinc pigments may contribute to blistering and staining. As the moisture in wood encounters these pigments, metallic soaps are formed which weaken the bond between paint and wood. When this happens, the paint film bellies out, forming blisters. As to stains, they are usually caused by water washing down over gutters, screens, or nailheads. This water carries metallic salts which react with the lead or zinc pigment. In areas where the air may be heavy with chemical fumes, the entire exterior may be affected by a similar reaction.

For a number of years, paint chemists have been steadily closing in on these problems. Much work in this field has been done by pigment manufacturers to the benefit of the entire industry. ADM chemists also have been looking for remedies. Briefly, it has been found that one of the best ways to make a stain and blister resistant paint is to eliminate lead and zinc, using such non-reactive pigments as titanium dioxide and magnesium silicate. The vehicles must produce a hard, tough film. Also, the paint should "breathe"—let vapors pass



BLISTER BOX is 18 inches long and 5 inches tall, and the top has cut-out openings in which to mount painted wood panels. Inside, the box contains water to a depth of about 1½ inches, heated to 135° F. by a heating element at the bottom. Under these conditions, the test panels will be doubled in weight by moisture within 24 hours, and at that time blisters will begin to appear on ordinary lead and zinc paints. Within 72 hours the blisters will reach extreme size.

One of eight test homes being painted in Minneapolis by ADM. Insert panel shows condition of finish before surface was scraped.

outward freely. A good stain and blister-resistant film may be compared to a popcorn ball in which you have a relatively solid mass and yet one that is permeable to air and moisture.

Recommended Vehicles

Among the hundreds of paint vehicles made by ADM, four have been found to have exceptionally good characteristics for stain and blister resistant finishes. Some of the conclusions on these products are backed by actual house painting tests started as long ago as 1947. Currently, ADM is painting another group of test houses which will be studied and photographed carefully from season to season.

These recommended ADM vehicles include two alkyds—Aroplaz 1271 and Aroplaz 1400; and two well known and versatile copolymers—Admerol 75-M and Var 70-M

Aroplaz 1271 shows up particularly well in durability studies. It has long oil length, low viscosity, and good dry. Aroplaz 1400 is similar, with slightly lower viscosity. Admerol 75-M is the fastest drying of all four vehicles, and gives better early protection against blistering than the alkyds. This is because it dries and cures faster. It also has lower solids than the alkyds. Var 70-M is similar to Admerol 75-M but costs less and does not have quite as good initial color. However, it bleaches rapidly to excellent whiteness.

A Suggested Program

Your best immediate step is to make up some exterior finishes and get them onto houses for testing and demonstrating. Here are some tips about best testing techniques. First, choose your test houses carefully. Be sure you know the extent and nature of the moisture problem. Repainting several homes that are similar in design where trouble exists is, of course, an excellent idea. Try to get one or two newly-constructed houses, too, for your test work.

You will want to get proper releases from the owners. ADM can furnish you with copies of standard releases if you wish. Also, plan to take photographs before the painting is done and at regular intervals thereafter.

Remember that your paint should have about 30 days to weather before winter temperatures set in.

For collateral testing, construction of a "blister box" for your lab is recommended. Drawings for such a box are available from ADM and will be sent on request.

What other new-product program offers paint manufacturers so large an immediate market, better profit potential, or greater customer good will? The need for stain and blister resistant paints presents you with a tremendous opportunity.

Use This Special Offer

To encourage manufacturers to get started at once, ADM now makes this attractive offer . . . 5 gallons of Aroplaz 1271, or Aroplaz 1400, or Admerol 75-M, or Var 70-M for just $5, delivered to your plant to be used in stain and blister resistant tests of your own. For additional information and evaluation samples of these four recommended vehicles, please write to Archer-Daniels-Midland Co., 700 Investors Building, Minneapolis 2, Minnesota. Or, better yet, call your closest ADM representative. He'll be glad to advise and help you with your stain and blister resistant paint program.

Introducing . . .
The Kaleidoscope

An endless variety of color, an eternal change of design, a constant source of amusement for the young at heart, a source of ideas for the designer.

This is a kaleidoscope.

This also is the name for a new source of ideas for you—a special publication which will be published from time to time to provide you with ideas for progress and profit.

As every turn of the kaleidoscope presents its viewer with a new variety of symmetrical varicolored forms, so will every issue of the ADM KALEIDOSCOPE provide its readers with ideas for selling more paint.

AMERICAN CHEMICAL SOCIETY members pause by a filter press holding tank for an explanation by ADM's Allan H. Altnow (arms folded) as they tour ADM pilot, distillation and bodying plants. 150 members made the plant tour, a feature of the A. C. S. 128th annual meeting.

NEW DECORATING BOOKLET DESCRIBES SUCCESSFUL USE OF COLOR

"The ABC's of Color," a sparkling new 24-page decorating booklet, reveals how the use of paint can work color magic in every room of the home. Stunning interiors, planned and executed by America's finest decorators, are shown in the 49 full-color illustrations. Clear, yet simple, explanations tell how each of these decorating schemes may be adapted for use with nearly every type of home furnishing—from rustic to formal, from French Provincial to Modern.

"The ABC's of Color," with its simple explanation of the color wheel and by its definitions of tints and shades, hues and tones, is also a fascinating, and practical, short course in color.

One of the booklet's sections shows how color schemes may be adapted from such sources as nature, fabrics, pictures, favorite colors and floor coverings. The reader also learns how to "transplant" a color scheme from a magazine. The booklet concludes with the answers to 16 often-asked questions about color.

Written by the editors of Better Homes and Gardens, "The ABC's of Color" has been made available to the paint industry by Archer-Daniels-Midland Company. It is priced at 18¢ a copy and may be ordered in quantity. By using a special color guide, a manufacturer may key his own line of paint to the paint colors shown in the illustrations.

The booklet is offered as a continuation of ADM's extensive Week-End Decorator and Positive Selling programs. Both of these programs have been developed as a service to the paint industry. "The ABC's of Color" was preceded by such popular paint promoting portfolios as "Colorful Living Rooms," "Colorful Bedrooms" and "Colorful Kitchens."

THE NEW LOOK! The labels on containers for ADM samples have been redesigned . . . and they are quite handsome too. All product information is now printed on the narrow side to conserve shelf space. Labels for experimental products provide space for lab. notes.

Technically Speaking . . .

SHELLAC SUBSTITUTE WHICH ADDS PERMANENT FLEXIBILITY to floor coatings and similar applications is made by modifying ADM Resin DX-228 with plasticizer and toughening agents such as zein, alcohol soluble nitrocellulose, and ethyl cellulose. DX-228, however, is <u>not</u> recommended as a shellac replacement in emulsion no-rub polishes. Arochem 460 is superior for that application. (Product 10-1)

HIGH VISCOSITY LACQUER PUTTY has several applications in the automotive field, including water troughs and joint seals. An unusual manufacturing procedure which overcomes the undesirable low solids found in most products of this type has been tested and the procedure is made available. (Product 10-2)

MONEY SAVING WALL PRIMER AND SEALER which compares with or surpasses the best on the market can be made with three ADM products. It combines the best qualities of limed oils (Ardanco V-160), the hardness of Aroplaz 1257-MO, and the economy of Admerol 351-M . . . at a saving of 5¢ per gallon. When pigmented, the combined vehicle blend produces excellent brushing, good bridging, and excellent recoatability and holdout. (Product 10-3)

A NEW AUTOMOTIVE REFINISHING ENAMEL gives the ultimate in durability, top dry wrinkling and tape or soap resistance. Based on a 2 to 1 blend of Aroplaz 1320 and 1031, Formula SS-10-1A enamels showed no tape marking and good adhesion after 4 to 5 hours dry. No marked softening or dulling were noted after soap resistance tests. The formula will be sent on request. (Product 10-4)

A NEW LACQUER SANDING SURFACER FOR MASONITE is included in the ADM Research Report on Lacquers, Bulletin #76-A. This formulation, #95A-16, is excellent for sanding and preparing a smooth surface for recoating. If you want a faster sanding material which can be removed down to the original Masonite, the addition of 40.8 pounds of Mistron T-076 will serve this purpose. The only change needed in the formulation is additional thinner to offset the oil absorption of Mistron. The bulking of 40.8 pounds of Mistron T-076 is 1.78 gallons. (Product 10-5)

Detailed information about any of the above products or formulations may be secured by filling out and mailing the coupon to ADM. Ideas from paint manufacturers for this column will be welcome.

ARCHER-DANIELS-MIDLAND COMPANY
700 Investors Building, Minneapolis 2, Minnesota

Please send me free information on:

- ☐ Product 10-1
- ☐ Product 10-2
- ☐ Product 10-3
- ☐ Product 10-4
- ☐ Product 10-5
- ☐ The ABC's of Color

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

Don't let your paints get in scrapes like this!

Use ADMEROL 75-M for Stain and Blister Resistant Finishes

● Do you want to formulate proved stain and blister resistance into your paints? You can with America's fastest selling vehicle for stain and blister resistant paints . . . Admerol 75-M.

Paints that will provide early protection against stain and blistering need a fast drying vehicle with the excellent durability of Admerol 75-M.

Admerol 75-M is fortified through copolymerization so it requires no additional fortification with zinc and lead pigments. Thanks to its fast dry and cure, paints made with Admerol 75-M are free from dirt collection and have excellent mildew, water, and alkali resistance.

Pigmented with titanium dioxide and magnesium silicate at approximately 31% PVC, it provides the ultimate in stain and blister resistance.

Evaluate Admerol 75-M in your laboratory. Check the coupon for samples, test data, and suggested stain and blister resistant formulations.

Why don't you make a house test this fall? We will be happy to supply the details if you just return the attached coupon.

Specifications Admerol 75-M

Percent Solids ± 1%	70
Viscosity G-H @ 25°	R-U+
Acid Value Solids	3.6 Max.
Color Gardner '53 Maximum	11
Average Pounds Per Gallon @ 25°C.	7.61

Archer-Daniels-Midland

Archer QUALITY

Other ADM products:

Linseed, Soybean and Marine Oils, Paint Vehicles, Synthetic and Natural Resins, Polyesters, Fatty Acids and Alcohols, Hydrogenated Glycerides, Sperm Oil, Foundry Binders, Industrial Cereals, Vegetable Proteins, Wheat Flour, Dehydrated Alfalfa, Livestock and Poultry Feeds.

ARCHER-DANIELS-MIDLAND CO.
700 Investors Building, Minneapolis, Minnesota

Please send the following:

Kit for setting up our own blister-resistance tests consisting of:
1. Plans for the blister box
2. Suggested formulations for Aroplaz 1271, 1400, Var 70 and Admerol 75-M
3. Release forms for test house owners

Name_____ Title_____

Firm_____

Address_____

City_____ Zone_____ State_____

NEWS

To Build Polyethylene Plant

Hercules Powder Co. has announced plans to enter an entirely new field of chemistry, with the construction of a plant at Parlin, N.J., for the production of new-type high molecular weight polyethylene.

The plant, with an annual capacity of approximately 30 million pounds, will eventually involve expenditures in the neighborhood of $10,000,000, including new construction, raw materials, and conversion of some of the existing facilities at Hercules' present Parlin plant.

•

Shell Dedicates New Plant

Shell Chemical Co. has formally dedicated its new allyl chloride and chlorohydrins plant at Norco, La., making it the nation's largest supplier of glycerine, according to R. C. McCurdy, president.

•

Improved "Coast" Service

The Los Angeles metallic stearates plant which opened in September has enabled Witco Chemical Co. to provide west coast customers with the same services now rendered midwest and eastern industries, according to Max A. Minnig, executive vice president.

Prying Eyes Shut Out By New Inexpensive Paint

An inexpensive paint that forms a barrier to prying eyes has been devised by research engineers at New York University. It can be brushed on window glass to obscure an outsider's view while permitting eighty percent of the natural daylight to enter.

Two panes of glass coated with the new paint. The top pane is flat against the paper, the bottom is two inches above it.

The translucent and colorless material, developed by Dr. Max Kronstein, NYU engineering scientist with Matthew King, senior assistant, is designed to be used when the installation of special glass is too expensive or otherwise undesirable—for example, in plants or offices where secrecy is temporarily necessary because classified work is in progress.

The paint is odorless and can be cleaned with a dustcloth and removed by brushing with water, or peeled off if it has been on the window a long time. It costs only a few cents a pound.

The paint is composed of water, methyl cellulose, and finely ground mica. The very thin and small platelets of mica scatter and bend the incoming light. Thus, unless objects are within two inches of the coated glass, they appear from outside as indistinguishable blurs or are completely invisible.

•

Skakel, Wife and Two Killed

George Skakel, Sr., Chairman of the Board of Directors of Great Lakes Carbon Corp., and his wife, Ann, died October 3, when a company plane in which they were passengers crashed near Union City, Okla.

Joseph W. Whitney and John E. McBride, company pilots, were also killed in the crash.

•

F. Stephenson Joins MCA

F. Gordon Stephenson has joined the staff of the Manufacturing Chemists' Association as assistant to the technical director.

In addition to general technical assignments, he will supervise the association's chemical data sheet program. He comes to MCA from the Cyril Bath Co. of Solon, Ohio.

NEW ENGLAND CLUB: Photo at left shows newly elected president, Dr. Alan R. Lukens (r), receiving the Nuodex Gavel from Howard Cookingham. The Executive Board is pictured in right hand photo. In the top row (l to r), are: Walter F. Kuster, Harry Kelfer, and Fred Alvarez. Seated are: James Raffi, Howard Jerome, Dr. Lukens, W. Holmes

where can you use these remarkable new

DOWANOLS

(Ethylene and Diethylene Glycol Ethers)

Can you use the high solvent power of Dow's new Dowanols? Can you benefit from the prevention of blush or orange peel. . .from the better flow-out and adhesion Dowanols impart to lacquers, inks, enamels, and varnishes. . .from increased penetration given to dyes. They are effective as mutual solvents and coupling agents for mixtures containing water and water-insoluble organic chemicals.

Caption	Dowanol 7	Dowanol 8	Dowanol 10	Dowanol 16	Dowanol 17	Dowanol 19
Chemical Name	Ethylene Glycol Methyl Ether	Ethylene Glycol Ethyl Ether	Ethylene Glycol n-Butyl Ether	Diethylene Glycol Methyl Ether	Diethylene Glycol Ethyl Ether	Diethylene Glycol n-Butyl Ether
Specific Gravity @25/25°C.	0.963	0.9275	0.899	1.018	0.9855	0.952
Boiling Range 5-95% @760m.m.Hg °C °F	123-126 254-258	133-136 271-277	166-173 330-343	189-195 372-383	197-203 387-397	225-233 437-450
Viscosity CPS @25°C	1.532	1.838	2.83	3.467	3.780	4.92
Flash Point °F (COC)	125	110	160	210	205	225
Dilution Ratio: Toluol L.D. Naphtha	4.0 0.3	5.2 1.1	3.3 1.8	2.3	1.9 0.2	
Solubility	All Dowanols infinitely soluble in water and practically all commercially available solvents					

For further information and samples, call your nearby Solvents and Chemicals bulk plant.

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Glycerine is another major product available from your best source of supply — your nearby Solvents and Chemicals bulk plant. For a complete product and price list and samples, call or write today.

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Alcohols and Acetates
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Aromatic Solvents, Petroleum and Coal Tar
Chlorinated Paraffins
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Glycols and Glycol Ethers
Ketones and Ethers
Oils and Fatty Acids
Plasticizers
Resinates-Sodium and Potassium
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Stearates
Terpene Solvents
Waxes

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WESTERN SOLVENTS & CHEMICALS CO. (CANADA) LTD.
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WISCONSIN SOLVENTS & CHEMICALS CORP.
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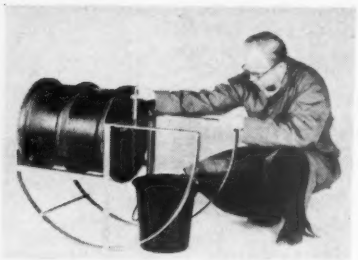
NEW MATERIALS & EQUIPMENT

A MONTHLY MARKET SURVEY

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.



NUTTING

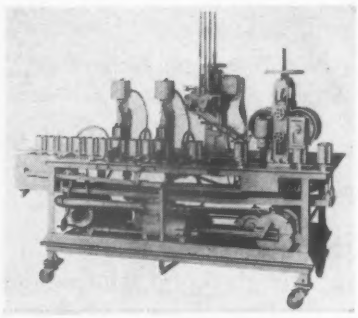
TILTER FOR RUBBER DRUMS
Has Controlled Pouring

Tilter, especially designed for pouring from the rubber drums used for solvents and chemicals, is said to be easy to load, save time and effort and, because of controlled pouring, eliminate spillage and waste. It is light weight, portable and requires little floor space. Non-slip clamp securely holds the drum. Nutting Truck and Caster Co., 1201 W. Division St., Faribault, Minn.

SMALL METAL CANS
Seamless

Seamless metal cans that are lightweight and unbreakable are recommended by the manufacturer for laboratory, production line and packaging use.

The line includes cans for packaging and identifying products; plain seamless slip cover or full open screw top cans for products that do not require identification or that require a private brand label; flanged top cans for hermetic sealing; decorated seamless cans lithographed to order, and special seamless cans made to individual specifications. George D. Ellis & Sons, Inc., American & Luzerne Sts., Philadelphia 40, Pa.



ELGIN

PAINT FILLER
Overcomes Paint Surge

Paint-filling by the second is now claimed possible with the "Double H" paint filler with cover dropper and capper.

It is designed with two filling heads and it successfully overcomes the long-time problem of paint-surge when filling cans at high speed, according to the company. Each head has its own cylinder and piston. Each can is filled about 70% at the first head and surge is eliminated at the second filling station because it is little more than a topping operation.

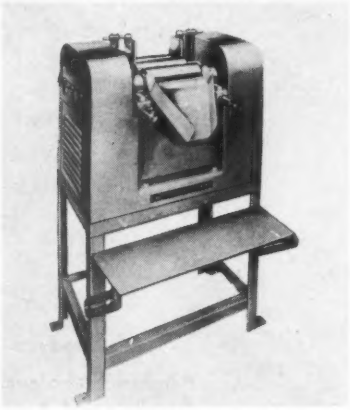
Field tests are claimed to show that a production run in gallons averages 25 to 30 gallons per minute—in pints, 30 to 65 pints per minute whether paints, enamels or lacquers. Elgin Manufacturing Co., 200 Brook St., Elgin, Ill.

SOYBEAN PRODUCT
Varied Uses

"Vergol" derived form gums and resins of soybean oil is said to be of particular use in the manufacture of shingle stain paints, barn paints; also as a thickening, blending, anti-caking agent. According to the producer, this material is a light-golden paste which easily disperses in solvents and drying oils, to form a vehicle of desired viscosity and neutral pH. John K. Bice Co., 440 Seaton St., Los Angeles, Calif.

LAB THREE ROLLER MILL
For Pilot Operations

Model No. 52LC, a 4½" x 10" laboratory size high speed three roll mill can be operated with fixed center roll and four-point adjustment or with floating center roll and two-point adjustment. Conversion from one type operation to the other is easily done by any operator without special tools or kits, according to the company.



CHARLES ROSS

Mill is built as a replica of the larger production size mills which is claimed to assure exact laboratory or pilot scale duplication of results obtained on the larger units. Charles Ross & Son Co., 148-156 Classon Ave., Brooklyn 5, N.Y.

ADDITIVE
For Alkyd Reduction

Additive called "Ester 113" is claimed to permit maximum reduction with minimum effect on dry time.

Use of product, a special grade of glyceryl monosoyate, is said to decrease and stabilize viscosity of odorless alkyd systems and permit reduction of alkyds with an odorless solvent by improving solvency characteristics of solvent. Also, manufacturer says, it can be used in greater concentration for any given dry time. The Baker Castor Oil Co., 120 Broadway, New York 5, N.Y.

N E W
MATERIALS — EQUIPMENT

ALKYD RESIN
Non-Oxidizing

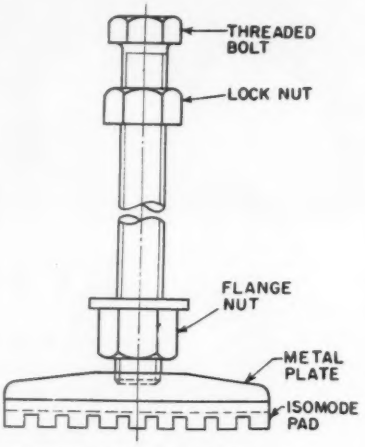
"Duraplex ND-76" an alkyd resin will help solve a long-standing need for greater color stability in white enamels produced at high baking schedules or used at high service temperatures, according to the company.

Enamels formulated with product are also claimed to have excellent hardness and mar resistance as well as high resistance to alkalis and household soaps. Kitchen appliances and hospital furniture present typical applications for these enamels.

Manufacturer says that compared with formulations based on current high quality alkyd resins, enamels made with product offer the following advantages: Tukon hardness 50 to 100 percent greater (baking temperatures between 200 and 300 F); gloss retention 150 percent better (after 16-hour exposure at 400 F); whiteness retention 100 percent higher on Photovolt comparator (after 16-hour exposure to 400 F); reduced blistering from prolonged immersion in hot solutions of soaps and syndets.

Enamels formulated with product may be applied by spraying or dipping. Xylol, toluol, high flash naphtha or butyl alcohol may be used as solvents.

"Duraplex ND-76" is said to be compatible with urea, melamine, triazine resins, and in most proportions with nitrocellulose, cellulose acetate butyrate, and some silicone alkyds. Resinous Products Div., Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa.



ISOMODE LEVELING MOUNT

MB

LEVELING MOUNT
For Vibration Control

A double-function leveling mount is claimed to permit quick and easy leveling without lagging to the floor of machinery of all kinds and also reduce the transmission of machine noise, shock and vibration. Production rates, machine accuracy and quality of finish are said to be improved. Mount is available in six models of three sizes. MB Manufacturing Co., Division of Textron-American, Inc., 1060 State St., New Haven 11, Conn,

WATER DISPERSED PIGMENT
Non-Ionic

Company's water dispersed pigments are offered for use in all three types of emulsion paints—Butadiene-Styrene, Acrylic and P.V.A. These dispersions are the stir-in type and are said to develop maximum strength with minimum work.

The following advantages are claimed for product: Non-ionic in nature; contain a small amount

DON'T TAKE A CHANCE!

VACUUM CLEAN HAZARDOUS LOCATIONS IN COMPLETE SAFETY... FOR ADDED SAFETY

Use a **Doyle**

EXPLOSION PROOF VACUUM

*The motor, switch, tank, hose, every part of the Doyle EXPLOSION PROOF Vacuum Cleaner is U. L. approved for safe operation in the presence of . . .

1. Atmospheres containing gasoline, hexane, naphtha, benzine, butane, propane, alcohols, acetone, benzol, lacquer solvent vapors, or natural gas.
2. Atmospheres containing starch, flour, or grain dust.

U. L. APPROVED* FOR HAZARDOUS LOCATIONS } **Class 1, Group D**
Class 2, Group G

Don't take unnecessary chances . . . improve your safety record by maintaining "good housekeeping" in critical areas with a Doyle Explosion Proof Vacuum Cleaner.

As part of your regular cleaning schedule, this portable, lightweight vacuum is safe for recovery of liquids or dry materials in atmospheres containing highly explosive or inflammable dust and gases. The entire unit is static conductive and has been tested and approved by Underwriters' Laboratories as explosion proof.

Use the Doyle Explosion Proof Vacuum Cleaner as you would an ordinary heavy duty industrial vacuum. The big difference is, now you can clean floors, walls, bins, beams, pipes or ceiling in hazardous areas. In many cases daily use of this rugged machine does a rapid and efficient job of guarding against an explosion or fire.

Keep your safety up by using a Doyle Explosion Proof Vacuum Cleaner. Every advantage of more than 25 years experience in manufacturing industrial vacuum cleaners is incorporated in this unit.

Write today for detailed information and specifications.

Doyle

Specialists in Industrial Vacuum Cleaning Equipment

VACUUM CLEANER COMPANY

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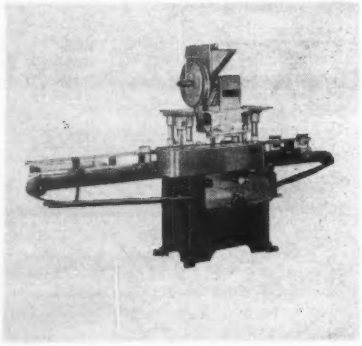
of bacteriostatic-fungistatic agent to inhibit growth (which would occur even in tap water); have good freeze-thaw stability; offer very little difficulty in terms of settling; have good compatibility in systems having a pH from 4½ to pH 9½.

The water dispersed pigments come in the following colors: Red (Toluidine Toner, Red Oxide-Light, Naphthol Red); Yellow (Hansa 10G, Hansa G, Yellow Oxide-Lemon); Green (Phthalocyanine Green, Pigment Green B, Chromium Oxide); Blue (Phthalocyanine Blue); and Black (Black Oxide, Black Umber). Kentucky Color and Chemical Co., 600 N. 34 St., Louisville 12, Ky.

AUTOMATIC SEALER
For Rectangular Cans

The "Resina Automatic Innersealer" sorts, feeds, and applies innerseals to various types and sizes of rectangular tin cans, according to the company. Machine has a capacity of 60 to 120 seals per minute, depending on the size of the container, and is equipped with vari-speed drive, a can spacing device and a ½ hp motor, built to meet customer specifications.



RESINA

Only three steps are said to be needed to operate the innersealer: The operator loads the hopper, adjusts for the size can being run, and switches on the machine to begin production.

Unit weighs approximately 900 lbs.; overall height, 7' maximum; conveyor height, 33" minimum. Resina Automatic Machinery Co., Inc., 572 Smith St., Brooklyn 31, N. Y.

"Doc, dermatitis control is simple as 1-2-3-4-5."

An exaggeration?

Not at all. Occupational skin irritation can be prevented. Simply. Inexpensively.

—with the WEST Dermatitis Prevention and Control Program that:
1—insures personal cleanliness
2—protects exposed skin areas
3—prevents clothing contamination
4—guards against special hazards
5—provides continuous consultation.

WORKERS free of skin irritation can save you hundreds, perhaps thousands, of dollars each year—by eliminating the cost of:
—medical treatment
—enforced idleness
—absenteeism
—sacrificed quality
—lowered morale
—production lags.

THE WEST Program for controlling skin irritations is based on individual shop requirements and an in-your-shop survey, made without obligation. Let a WEST representative plan the details. Or send for our 24 page booklet on the "Control of Industrial Dermatitis."

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Position_____

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N E W
MATERIALS — EQUIPMENT

SPEED LOCK COVER
For All Models

The "Passalaqua" speed lock cover, approved by ASME, will be standard equipment on all Model "MCR" retractable tank vertical plate filters. The safety cover has proven particularly useful for pressure vessels that require frequent opening, according to the company.

The cover is locked by a series of visible bow-shaped lugs mounted on a third ring. The lugs are in direct rectangular shear. Even if one lug fails, company says, the cover remains locked because the stress divides itself equally among the remaining lugs, which have a high safety factor.

SPARKLER

Third ring has a locking arrangement that locks in both the open and closed position. Engaging all holding devices, it is simultaneous and foolproof, according to the company.

The ring floats in roller bearings and its lugs are not under shear until internal pressure in the tank is built up. Even in a large diameter tank, the ring travels through an arc of only 15 to 20 degrees. This enables the cover to be opened in seconds, without the use of hand tools or power devices.

An O-ring sealing gasket is incorporated which gives a self-seal that becomes tighter in direct proportion to the increase in internal pressure, company says. Sparkler Manufacturing Co., Dept. P, Mundelein, Ill.

LITHIUM RICINOLEATE
Alkyd Catalyst

Lithium ricinoleate, a catalyst, is claimed to be faster and more reliable than any ester-interchange agent now in use.

Points claimed are: No poisoning by residual phthalic; ideal in fusion cooks; reduction of alcoholysis reaction time; better than lime or litharge catalysts because it won't form colloidal metallic phthalates; produces light-colored, precipitate-free monoglycerides; can be used with glycerine or pentaerythritol as polyol; effective for all oils particularly dehydrated castor oils. The Baker Castor Oil Co., 120 Broadway, New York 5, N. Y.

HUMIDITY CONTROLLER
Quick Setting

The "Humistat" automatically operates large or small humidifiers, dehumidifiers, and air conditioners to maintain humidity control within plus-minus 1.25% relative humidity, according to manufacturer. It is said to be so sensitive that the moisture from a person's hand will operate it.

For maximum sensitivity and versatility, the relative humidity range of 5% to 95% is covered by

Have Phthalic Supplies Had You Upside Down?

If you've been in a spin about phthalic anhydride supplies, remember this: Pittsburgh Coke & Chemical is a basic producer of phthalic, with complete control of every step of production from coal to packaged product.

Because we're basic, we can offer you two important benefits: (1) Dependable, continuing supplies from our integrated plant. (2) Assured purity, low color value and low maleic anhydride content—thanks to Pittsburgh quality-control from coal to finished phthalic anhydride.

And make a note of this: Pittsburgh is situated in the bull's eye of the nation's industrial heart area. That means you can forget about long delays-in-transit. In fact, deliveries to most points in 24 hours or less are not considered unusual.

We'll welcome the opportunity to prove to you that it pays to buy from a basic producer. Call Pittsburgh for your next order of flake or molten phthalic!

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in Flake in 80# Bags and in Molten Form by Tank Car or Tank Truck

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individual sensing elements with operating ranges of about 15% relative humidity.

Humidity control settings within each element range are claimed to be made in a few seconds. A calibrated resistor is plugged into the unit and a potentiometer knob is turned until a click is heard. The unit is thereby set for a specific humidity control point independent of the sensing element and without recourse to calibration devices. American Instrument Co., Inc., Silver Spring, Md.

TEMPERATURE BATH
For High Temperature Testing

The "Hy-Temp Aging Bath," a constant temperature bath, said to be capable of continuous high temperature operation in tempering, conditioning, preheating and stability tests, and in routine laboratory work, has been newly redesigned.

The bath conforms with the latest specifications for ASTM Methods D 471 and D 735, according to the company.

A sensitive dual hydraulic thermostat, maintaining control to ±1°C from 35°C. to over 225°C, consists of two complete systems, one acting as a safety thermostat in the event of failure of the other. Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill.

LATEX THICKENER
Polyacrylate Type

"Polyco 296-W," a polyacrylate thickener, is said to have an exceptional thickening effect on natural latex, Buna N rubbers, butadiene styrene, GR-S latex and most polyvinyl acetate and other synthetic resin emulsions.

According to company, product introduces no undesirable odor or color into compounded products and causes no syneresis and coagulation. There is said to be no separation, and approximately neutral pH permits use with sensitive emulsions. Viscosities are claimed to be unusually stable over long periods of time. Polyco Dept., The Borden Co., Chemical Div., 101 Foster St., Peabody, Mass.

TESTING FUNGICIDES

(*From page 34*)

advantageous if the addition of the fungicide can be confined to a low concentration, never above 10%. Further, an effective agent should not act as a plasticizer, nor should it increase the drying time necessary for film formation. On the other hand, the lacquer film should not be too hard, nor become too brittle. The fungicidal medium should be neither extractable from the vehicle by water, nor spontaneously exuded. It should be soluble in lacquers or in their solvents, but not in water. In blending at high temperatures it must remain stable; should not cause discoloration of the coating—factors necessary for lacquers, especially those for cosmetic use. The fungicidal preparations must not be harmful to man, despite their fungicidal effect, unless contact with human beings is out of the question, as is the case in antifouling paints. For such paints poisonous materials may be used without hesitation; Ragg (1954) obtained good results against the dangerous growth of marine life on the bottom of ships. Care in the choice of fungicidal lacquers and paints is required in painting hospitals, public baths, schools and barracks, so that there can be no danger to life. Phenols and cresols, mercury, arsenic, copper and similar metals are therefore unsuitable for these purposes. It is claimed that none of these poisonous substances are used in the British preparation "Dentolite," the effectiveness against fungi of which has been illustrated for comparative purposes.

It is clear from the laboratory studies that suitable fungicides, together with the correct choice of lacquer—or paint bases is of decisive importance for satisfactory fungicidal performance. The slide-film test has proved itself reliable, and it has contributed considerably to the development of new fungicidal lacquers and paints to meet the increasing need for such preparations in coating applications.

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Rothman, St.: Arch of Dermat. 67, 239 (1953)
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Maas & Waldstein Take Part In G. E. Seminar

Maas & Waldstein Co., Newark, N. J., Chicago and Los Angeles, was selected as the representative company of the paint, varnish and lacquer industry to participate in the recent "Value Analysis Seminar" sponsored by the General Electric Co. The seminar, held in Nahant, Mass., was attended by approximately 125 value analysis supervisors from GE's River Works.

B. F. Ames, general sales manager, and P. L. Blay, technical service representative in the Boston area, attended.

Commenting on the importance of value analysis seminars, Mr. Ames said, "Value Analysis groups are constantly seeking superior coatings for their products that would ultimately help to reduce costs without sacrificing quality."

Among the many coatings displayed and discussed by Maas & Waldstein as having value for use on parts manufactured by GE were "Plextone" multi-colored textured enamel; "Hammertone" and "Duart" wrinkle enamels; "Coprene" rubber based enamels; "Durachem" chemical resistant coatings and "Water Dip #33."

PHILLIPS 66

SOLTROL*

ODORLESS MINERAL SPIRITS

Choose Soltrol 130 for its fast drying characteristics. Use Soltrol 170 if you want longer wet edge.

Soltrols are available in 4,000 or 8,000 gallon tank cars, or in 6,000 gallon compartment cars containing both Soltrols. Phillips customers enjoy prompt service and dependable supply at all times. Write for complete information.

FREE TEST SAMPLES

Like to test Phillips 66 Soltrols? We'll gladly send you samples for evaluation. Just tell us how much Soltrol you need to prove to yourself the advantage of *odorless* Soltrols in your products.

PHILLIPS PETROLEUM COMPANY
SPECIAL PRODUCTS DIVISION
BARTLESVILLE, OKLAHOMA

*A Trademark

FEDERATION MEETING

(*From page 37*)

Inc. Panel members included G. Allyn of Rohm & Haas; J. C. Becker, Jr. of Celanese Corp. of America; F. H. Foxlee of Bakelite Co.; L. J. Horan of National Starch Products, Inc.; W. Parle, California Ink Co.; F. K. Quigley, Jr. of the Dow Chemical Co.; E. C. Scholl o. Esco Laboratories; and F. B. Stieg, Jrf of Titanium Pigment Corp.

This panel discussion was conducted, by and large, in an informal manner. The panel members were given several opportunities to present their respective views on a range of problems associated with emulsion paint technology.

Scholl stated that with the three latices now available styrene-butadiene is recommended for trade-sales; PVA for masonry but manufacturers went in it too fast with the result that many failures have taken place; acrylic types can be used for high quality paints at a higher cost compared to the other types of latices.

In evaluating the properties of the three latices, Steig said that PVA has good flow properties and is resistant to solvents, acrylic has poor flow properties, and the styrene-butadiene type has the advantage of being the first in the field and most formulators are familiar with its characteristics.

Parle commented on the fact that all three types were good for exterior use and that PVA had the edge in primer-sealer applications. However, more work must be done on exterior application, especially in areas where climatic conditions are a factor.

Quigley pointed out that styrene-butadiene was the most versatile latex emulsion which could be used with both synthetic and protein thickener and also is compatible with most oils and pigments.

Foxlee, Becker, and Horan presented the attributes of PVA emulsion paints. Foxlee said that such paints had low foaming and good application; Becker commented on the fact that since there was so much room for improvement, PVA offered a good bet; and Horan dwelt on such characteristics as viscosity stability and excellent flow and leveling characteristics of the PVA type.

"Colonel" Billy Hood

A highlight of the last day's session was the open forum meeting conducted by "Colonel" Billy Hood of the Southern Club. The questions presented at this meeting ranged from production problems to what to do with clean up wash. In many cases the questions were humorously phrased and various answers from those in attendance were presented. Awards to those who answered any of the questions correctly consisted of a silver dollar, a mint julep, a confederate trivet, or a bag of hominy grits and boll weevils. Those attending this open forum discussion not only enjoyed themselves but collected some valuable information.

33rd Federation Meeting Highlights-4

Two other panel discussions were presented on the final day of meeting. "Corrosion" was handled by Dr. Wouter Bosch of North Dakota Agricultural College and "Plant Safety" by F. Gaugush of the Sherwin-Williams Co.

Paint Industries' Show

Eighty-four exhibitors participated in this year's Paint Industries' Show which was the largest ever staged. Polyvinyl-acetate copolymer emulsions dominated this years show with some eight firms exhibiting this particular type of emulsion.

New raw materials consisting of alkyds based on isophthalic acid plus a three alkyd system for making a complete line of paint products were shown.

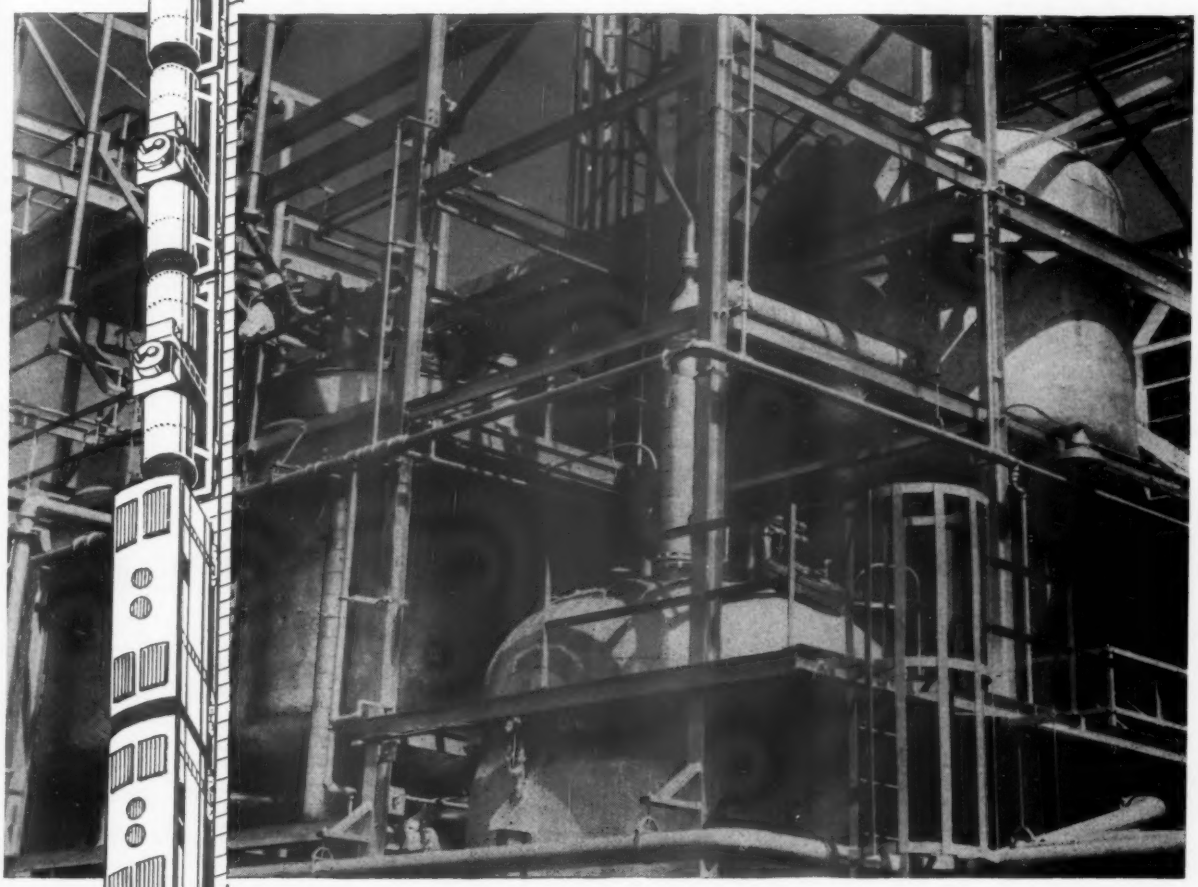
In the way of new equipment, paint manufacturers saw for the first time a new sieving and straining machine.

New Officers

Officers for the 1955-1956 term are: President—Clyde L. Smith of the Los Angeles Club; President-Elect—Milton A. Glaser of the Chicago Club; Treasurer—Howard G. Sholl of the Baltimore Club; and C. Homer Flynn remains Executive Secretary.

The next annual meeting of the Federation will be held in Cincinnati, Oct. 21-24th, 1956

Trainloads of GEN-FLO* Latex from these "TAILORED" TWINS



This twin reactor system is the heart of a specially designed plant devoted exclusively to the production of Gen-Flo latex. With every stage guarded by electronic instrumentation and highly-trained paint and polymer chemists, latex of proven uniformity pours from these reactors in a stream that never varies from one trainload to the next.

For samples, literature and technical assistance write to The General Tire & Rubber Company, Chemical Div., Akron, Ohio.

Chemical Division
GENERAL
THE GENERAL TIRE & RUBBER CO.

GEN-FLO

Creating Progress Through Chemistry

General Tire also produces . . .

Vygen* (Polyvinyl Chloride) • Gen-Tac* (Vinyl Pyridine Latex) • Kure-Blend MT® (Accelerator Masterbatch) • Glykon* (Polyester Resin) Polystop® (GRS Shortstop) • Ko-Blend® (Insoluble Sulfur Masterbatch)

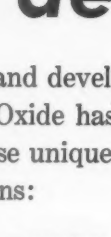
*T. M. G. T. & R. Co.

Now for house paint formulations

EAGLE-PICHER
414 ZINC OXIDE
LEAD FREE
wets easier, faster!
reduces oil demand!

Now, after years of extensive research and development in the Eagle-Picher laboratories, the new 414 Zinc Oxide has been "fence-tested" and proved on the job. It provides these unique and highly desirable features in your house paint formulations:

- **Reduced oil demand! Saves money!**
- **Increased gloss retention!**
- **Superior mildew resistance!**
- **Improved blister resistance!**
- **Greater film flexibility!**
- **Easier, more uniform brushing qualities.**



AND REMEMBER . . .

Eagle-Picher maintains rigid quality control from ore to finished pigment . . . and as the largest producer of *both* zinc and lead pigments, provides unequalled and unbiased customer service.

Since 1843

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Largest Producer of Both Zinc and Lead Pigments

General Offices: Cincinnati 1, Ohio

Regional Sales Offices: Chicago, Cleveland, Dallas, New York, Philadelphia, Pittsburgh

PERSONNEL CHANGES

PITTSBURGH PLATE GLASS

Walter W. Ethier, Jr., formerly manager of the Atlanta paint division in East Point, Ga., has been named general manager of the Newark, N.J., paint division. He succeeds A. I. Pruett who resigned recently.

W. W. Ethier, Jr.

Charles R. Holman has been appointed general manager succeeding Mr. Ethier at the Atlanta Division. Prior to his appointment he had served as assistant manager at Newark since 1954.

J. F. Green

C. R. Holman

John F. Green has been appointed general manager for the Ditzler Color Division in Detroit, Mich. He had served since 1954 as assistant general manager for the Detroit division which produces finishes for the automotive industry.

Harold H. Hill has been made general manager of automotive finishes. This new position has been created because of the company's increased participation in serving the automotive industry in recent years, according to E. D. Peck, vice president in charge of the paint and brush division.

CARBIDE AND CARBON

J. M. Cole and **J. H. Mathewson** have been appointed product managers and **George Trigaux** has been appointed assistant product manager in the fine chemicals division, according to an announcement by W. A. Woodcock, manager.

Mr. Cole, assisted by Mr. Trigaux, will be responsible for the market development of chemical intermediates.

Mr. Mathewson will be responsible for the market development of "Flexol" plasticizers and stabilizers for vinyl resins.

SHERWIN-WILLIAMS

S. B. Coolidge, vice president and director of auxiliaries, has announced the following appointments:

Kenneth Lewis, who since 1954 has been assistant superintendent of the Chicago can plant, has been named superintendent of the new container production installation scheduled to be opened at San Leandro, Cal. early this month.

Succeeding Mr. Lewis in Chicago is **Richard E. Heine** who has been superintendent of the Deshler plant since 1953. He supervised building of the installation and later directed operation of the paint roller plant.

E. L. Barrett has been named to fill the post vacated by Mr. Heine. Prior to his present appointment he had been assistant to Mr. Coolidge at Cleveland headquarters.

AMERICAN CAN

Lester W. Graaskamp, vice president in the executive department and a director of the company, has been named vice president in charge of Central Division operations, it was announced by William C. Stolk, president.

He succeeds Michael P. Cortilet, who died last August.

Mr. Graaskamp joined the company in 1920, and spent the first 24 years of his career in the Chicago and division sales organization. In 1941 he became assistant manager of sales in the division.

Three years later he was transferred to New York as assistant general manager of sales and in 1946 became general manager. He was elected vice president in charge of sales in 1949 and held this post until 1951 when he became vice president in the executive department.

ARCHER-DANIELS MIDLAND

Ellis D. English and **Carl C. Farrington** have been elected to the executive committee it was announced by Thomas L. Daniels, president. Both are vice presidents of the company.

Mr. English is vice president in charge of the Commander-Larabee milling division and the formula feed division. He was elected a vice president and director in 1950.

Mr. Farrington has managed grain operations since 1948. He was elected a vice president in 1948 and was elected to the board of directors the following year.

The election of **James C. Konen** as a vice president and **Earl E. Branson, Ralph Bruce,** and **Frank J. Seidl, Jr.** as assistant vice presidents has been announced by the company. The appointment of **Burton W. Schroeder** to the newly created position of assistant to the president was made public at the same time.

Mr. Konen, formerly assistant vice president and director of research, succeeds **S. O. Sorenson,** vice president in charge of research who has retired due to poor health. He will be in charge of the firm's diversified research activities which include work on oils, resins, chemicals, foundry products, flour, feed ingredients, and feeds.

Mr. Branson has been in charge of feed operations since 1953.

Mr. Bruce has been associated with the company since 1937 when he started work in the grain division. His promotion places him in charge of the flax department.

Mr. Bruce is treasurer of the newly formed National Flaxseed Processor's Association, and is a member of the Flax Development Committee, the Flax Institute of the United States, and is a director and member of the executive committee of the Bureau of Raw Materials.

Mr. Seidl joined the company, in 1940 as an assistant grain buyer in the barley department. Following this he was named manager of the race horse oats department, and became assistant manager of the barley department.

Mr. Schroeder was elected an assistant vice president last February. He is manager of the industrials cereals division, and also in charge of the sale of vegetable fatty acids.

Mr. Sorensen, who retired as vice president in charge of research, will continue with the company in an advisory capacity. He is a past president of the American Oil Chemists Society.

EMERY INDUSTRIES

Paul Bogner has been assigned to the Chicago district sales office, it was announced by R. F. Brown, chemical sales manager.

Paul Bogner

The area, consisting of Minnesota, Wisconsin, the northern half of Iowa, northern Illinois and part of metropolitan Chicago, will be Mr. Bogner's direct sales responsibility. He will handle all chemical products including fatty acids and derivatives, plasticizers and textile oils.

Prior to joining the company, he was associated with the sales organizations of Inland Wire Co. and Charles Pfizer & Co.

PECORA PAINT

Horace M. Garton has been elected vice president and treasurer, it was announced by H. Wesley Hibbert, executive vice president.

Mr. Garton began with the company in 1920 as an office clerk. Through the years he served the company in various capacities and in 1947 was elected treasurer. Later he became a director.

Boris W. Pozniak, John W. Becker and **John C. Anzengruber** have joined the laboratory staff.

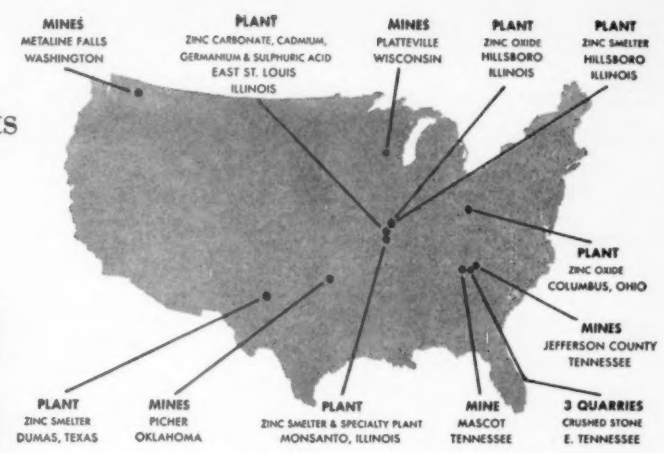
Mr. Pozniak will work on the expanding vinyl-polymer program.

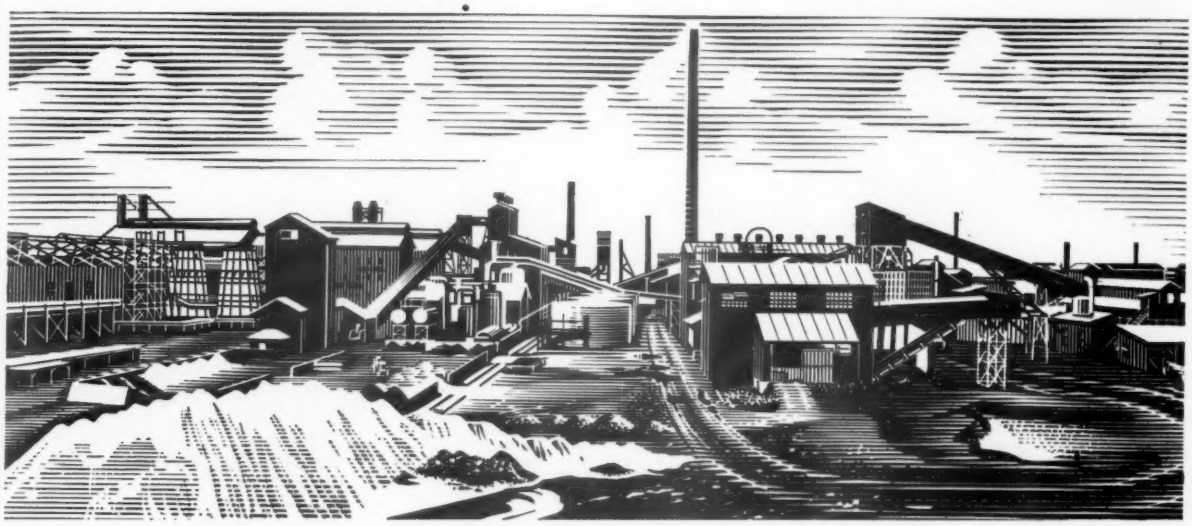
Mr. Becker, considered an expert in the starch and dextrin adhesive fields, becomes a member of the research and development program.

Mr. Anzengruber will be associated with the synthetic resins and specialized adhesives development program.

American Zinc and its products

from A *to* Z





FAIRMONT CITY, ILLINOIS
(East St. Louis)

Operations include: roasting and sintering of zinc concentrates; cadmium plant producing commercial balls, sticks and plates; zinc carbonate plant; germanium plant producing germanium dioxide for the electronics industry. Sulphuric acid is produced by both the Chamber and Contact methods. For complete picture of American Zinc operations, see map above.

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
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Distributors for

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CELITE diatomite pigments form a tough, dead-flat surface

Intricately shaped Celite particles, shown in photomicrograph above, project through the film to produce a highly visible textured surface.

TRAFFIC LINES are only as good as their visibility. That's why many states specify Celite in their traffic paints. These microscopic particles roughen the texture of the paint film cutting gloss and creating a flat surface that is highly visible under all conditions both day and night.

What's more, being silica, they are strong and rigid, imparting abrasion and wear resistance. Celite speeds drying by permitting the paint film to breathe. This also counteracts the usual flaking and cracking action caused by the vapor pressure of moisture coming through the concrete.

Celite particles provide better adhesion to any road surface, increase body and give good workability. For further information write Johns-Manville, Box 60, New York 16, New York. In Canada, 565 Lakeshore Road East, Port Credit, Ontario.

JOHNS-MANVILLE JM PRODUCTS

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products

Johns-Manville CELITE THE EXTENDER PIGMENTS FOR ALL COATINGS

GARDNER LABORATORY

Dr. Mark W. Westgate, formerly chief chemist, technical division, National Paint, Varnish & Lacquer Association, has joined the staff.

M. W. Westgate

Dr. Westgate has also been chemist and then director of the scientific section of the Association. Prior to that, he had been a chemistry instructor at the University of Maryland; before that, a graduate assistant in the chemistry department of the University of Hawaii.

He has contributed to numerous publications on topics of interest to the coatings industry, including evaluation of potential raw materials, fire retardant paints and particularly the development of physical and chemical testing methods and apparatus.

HERCULES POWDER

Frank G. Oswald has been appointed to the newly created position of manager of new product sales for the synthetics department, it was announced by J. W. L. Monkman, the department's director of sales.

He will be responsible for planning, coordinating, and supervising introductory sales activities and sales promotion. His duties will encompass a wide variety of products including polyhydric alcohols and products of the xylene oxidation process.

Emmett E. Hixon has been appointed manager of plastics sales of the Cellulose Products Department.

Mr. Hixon, who has been cellulose products district manager in the Detroit office will now work out of the home office in Wilmington.

The sales and promotional activities for all plastic materials produced by the Cellulose Products Department will be consolidated under Mr. Hixon. Under the new organizational alignment, **J. B. Martin,** who has been manager of "Hercocel" molding powder sales since 1952, will supervise plastics promotion activities while **L. T. Barnette** will continue to supervise sales and development work connected with cellulose acetate flake.

HEYDEN

Thomas M. O'Neil and **Arthur Minich** have been elected vice presidents, it was announced by Simon Askin, president.

Mr. O'Neil will continue as vice president of Nuodex, a wholly owned subsidiary, in charge of sales and marketing. Mr. Minich will continue as president of Nuodex.

CARBIDE AND CARBON

D. B. Benedict has been appointed a vice president, it was announced by H. B. McClure, president.

He will be responsible for long range planning in certain research and development activities, as well as all programs on synthetic fibers.

Mr. Benedict began his employment with the company in 1933 as a technical assistant in the Chlorhydrin Dept. at the South Charleston, W. Va., plant. He progressed through a number of positions there, becoming assistant superintendent of chemicals and resins in 1940 and general superintendent of the plant in 1952. He was transferred to the New York Office in November, 1953, when he became assistant works manager. In June, 1954, he was appointed works manager of the company.

EMULSOL CHEMICAL

Dr. Charles F. Fuchs has been elected a member of the board of directors, it was announced by Robert I. Wishnick, president of the Witco Chemical Co. of which Emulsol is a division.

He is also vice president and technical director of Emulsol.

Dr. Fuchs, a recognized authority in the field of surface active agents, joined the company in 1944, after a distinguished career on the faculty of the University of Vienna, where he had received his Ph. D.

AMERICAN CHEMICAL PAINT

F. P. Spruance, Sr. who has been a vice president of the company and sales manager of the Metalworking Chemicals Division for more than 30 years has resigned and is succeeded by **F. P. Spruance, Jr.,** who will direct the sales program of this division.

HERCULES

Roland S. Sawdey has been appointed manager of the Detroit sales district, for the Cellulose Products Dept.

R. S. Sawdey

He succeeds Emmett E. Hixon, who has been named manager of plastics sales for the department.

Mr. Sawdey joined the company in 1948, after graduating from the University of Minnesota with a degree in chemical engineering. For the past four years, he has been connected with the Cellulose Product's Detroit Office in a sales capacity.

AMERICAN PLASTICS

F. William De Bree has been appointed general sales manager of American Plastics Corp., a subsidiary of Heyden Chemical Corp., it was announced by Walter J. A. Connor, executive vice president of American.

For the past seven years Mr. De Bree was New York sales manager of molding powder for Hercules Powder Co. Previously he was associated with Koppers Co. as production supervisor of the Berkeley Heights, N. J. molding powder plant.

AMERICAN CYANAMID

E. F. Akers has been appointed manager of the Damascus, Va. plant, it was announced by V. E. Atkins, general manager of the Organic Chemicals Division. As general superintendent, Mr. Akers has been managing the Damascus plant for the past five years.

He joined the company in 1930 as a control chemist in the Damascus plant, was appointed chief chemist in 1933, assistant general superintendent in 1949, and general superintendent in 1950.

CELANESE

Willfred W. Lufkin, Jr. has joined the company as a vice president and as president of its foreign trading subsidiaries. For the past three years, he has been president of Wellington Sears Co.

W. W. Lufkin, Jr.

Mr. Lufkin will have his headquarters in New York City, but will travel extensively throughout Europe, South America and the Far East.

During the past 30 years he has been associated with Ipswich Mills, Inc., Spool Cotton Co. and Dan River Mills, Inc., where he served as vice president, general sales manager and a director as well as president of G. A. Stafford Co., an export subsidiary. Mr. Lufkin joined Wellington Sears in 1950, was elected a vice president in 1951, became executive vice president in 1952 and president the same year.

COLWELL PRESS

J. A. Eriksen has been named chief chemist of the Colwell color card division, according to Felton Colwell, president. He succeeds **J. V. Porter,** who resigned to join Archer Daniels Midland Co.

J. A. Eriksen

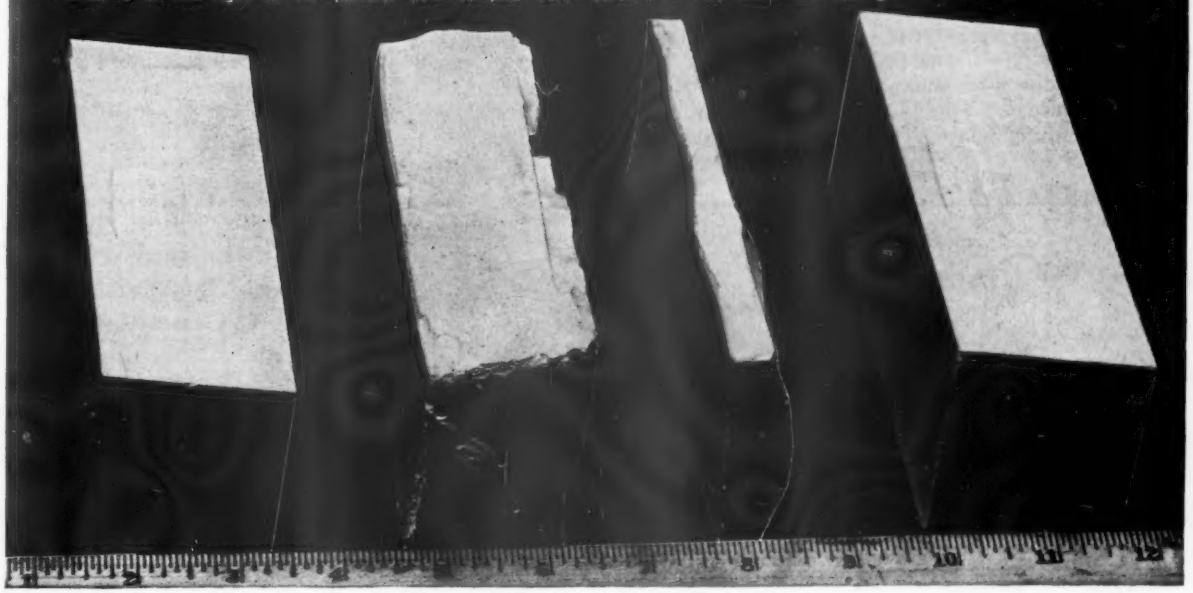
Mr. Eriksen is a 1949 graduate of the University of Minnesota, and received additional instruction at North Dakota Agricultural College under Dr. Wouter Bosch. Before joining the division, he served as a chemist with Forman-Ford Paint Co., and Consolidated Printing Ink Co.

U. S. STONEWARE

John B. Scales has been appointed technical sales representative of the Chemical Ceramics Division, it was announced by Howard Farkas, vice-president of the company. He will work out of the home office in Akron, Ohio.

McDANEL

At left is the McDanel Super High Density Brick before and after one of the exhaustive field test runs. Regular porcelain brick is at the right of the picture. Both samples were installed in the same mill during tests.



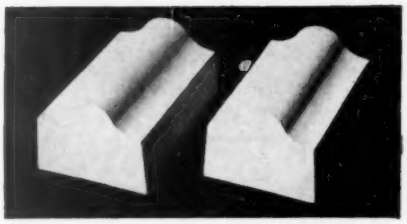
NEW HIGH DENSITY MILL LINING BRICK

HARDER! LONGER LASTING! LOWER COST!

● As early as 1952, McDanel placed this amazing super high density mill lining in the field to test it. Test after test, McDanel Super High Density Brick has lasted two and a half times longer than standard porcelain linings. You know what this means in lower mill operating costs! McDanel Super High Density Mill Lining proved to be harder, more uniform and longer lasting. Start saving on operating costs, and get better results from your mills. Investigate this new McDanel Super High Density Mill Lining Now!

WRITE FOR THE FACTS!

This four-page folder, "Facts About McDanel Super High Density Mill Linings" is yours for the asking. Gives weights, performance data, sizes, advantages and cost information. Send for yours today!



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McDANEL *Industrial* PORCELAINS

McDANEL

REFRACTORY PORCELAIN COMPANY

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NEWS

Goodyear Field Men Discuss "Pliolite S-5"

New developments with masonry and stucco paint formulations using "Pliolite S-5," synthetic rubber resin made by the Goodyear Tire & Rubber Co., were introduced at the recent sales conference held in Akron, Ohio, by the Coatings Department of the firm's Chemical Division.

Field representatives attending the meeting saw how new paint formulations based on these resins produced uniform color distribution over masonry surfaces painted with deep tone paints according to a release from the company. The mottling problem is said to be successfully overcome through use of the new formulations.

Actual presentation of laboratory data and development work on the new formulations was given by John Platner, sales service representative of the Coatings Department. He discussed the method of formulating "Pliolite S-5" to promote color uniformity in deep tone stucco and masonry finishes.

WINNER: Miss K. Stamer of J. H. Calo Co. is presented with a portable radio by Herman Kristeller of Farnow Inc. Miss Stamer was one of the winners in the "Scrubbability Contest" run at the Farnow booth at the recent Convention of the Federation of Paint and Varnish Production Clubs held in N. Y.

•

Soybeans Get Division Status At General Mills

President Charles H. Bell of General Mills has announced that soybean operations, formerly a part of the chemical division, has been established as a separate division.

The change means that soybeans, which are processed at Belmond, Iowa, and Rossford, Ohio, and the fatty acid operations, located at Kankakee, Illinois, will each receive division status. Fatty acids and specialty chemical products will continue as the Chemical Division.

The reorganization was recommended by Sewall Andrews, for the past two and one-half years manager of the Chemical Division, and Arthur D. Hyde, vice president and administrator of mechanical and chemical operations.

Mr. Andrews will be general manager of the new Soybean Division, and William D. Mitchell, most recently vice president in charge of operations at Pennsylvania Salt Co., has been appointed manager of the Chemical Division.

•

To Double Plant Capacity

Increased demand for vinyl acetate resin from the paint, adhesive, textile and paper industries, necessitates doubling the capacity of the National Starch Products plant at Meredosia, Ill., according to Frank Greenwall, president. The plant went into full production in August of this year.

PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries $1.00 per copy) to the publisher.

Drying Oil Composition

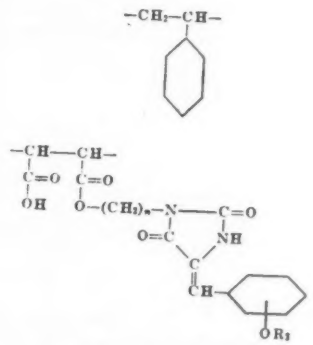
U. S. Patent 2,715,072. Joseph A. Chenicek, Bensenville, and Robert H. Rosenwald, Western Springs, Ill., assignors to Universal Oil Products Company, Chicago, Ill., a corporation of Delaware.

A coating composition comprising a drying oil normally tending to form skin, a metallic drier and a retarder of skin formation comprising a 2-tertiary-alkyl-4-alkoxyphenol.

Hydantoin Esters of Maleic Anhydride Copolymers

U. S. Patent 2,719,141. Albert C. Smith, Jr., Rochester, N. Y., assignor to Eastman Kodak Company, Rochester, N. Y., a corporation of New Jersey.

A resinous ester copolymer comprising the recurring structural units:



U. S. Patent No. 2,719,141

in the molar ratio of from 0.5:1 to 3:1 of units of (1) to units of (2), wherein *n* represents an integer of from 2 to 4, and R_2 represents an alkyl group containing from 1 to 4 carbon atoms.

Siloxane Resins

U. S. Patent 2,718,483. Harold A. Clark, Midland, Mich., assignor to Dow Corning Corp., Midland, Mich., a corporation of Michigan.

An organosilicon resin copolymer consisting essentially of 4.5 to 17 mol per cent diphenylsiloxane units, 22 to 55 mol per cent monophenylsiloxane units, and 40 to 65 mol per cent monomethylsiloxane units.

Modified Polyacrylonitriles

U. S. Patent 2,719,144. Newton H. Shearer, Jr., and Harry W. Coover, Jr., Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N. Y., a corporation of New Jersey.

A modified acrylic nitrile polymer selected from the group consisting of a polyacrylonitrile in which approximately from 10 to 20 percent of the nitrile groups are converted to —CO—NH—CRR_1R_2 groups and a polymethacrylonitrile in which approximately from 10 to 20 percent of the nitrile groups are converted to —CO—NH—$CR_1R_2R_3$ groups, wherein each R_1 represents a member selected from the group consisting of a hydrogen atom and a methyl group and each R_2 and R_3 represents an alkyl group containing from 1 to 2 carbon atoms.

Manufacture of Pigmented Chips

U. S. Patent 2,718,513. Wallace A Beardsell, Weston, Mass., assignor to Monsanto Chemical Company, St. Louis, Mo., a corporation of Delaware.

Pigmented chips for use in pigmented coating compositions comprising (1) a copolymer consisting of the copolymerization product of a polymerizable vinyl compound having the structural formula: R—CH═CH_2, where R is a member selected from the class consisting of phenyl and substituted phenyl radicals, with a secondary alkyl half ester of an ethylene α,β dicarboxylic acid, said vinyl compound and said half ester being copolymerized in a molal ratio of 1:1 to 2:1, (2) a plasticizer for said copolymer and (3) from about 60 to 70% by weight, based on the total weight of the chips, of a pigment.

Siloxane Elastomers

U. S. Patent 2,718,512. Earl L. Warrick, Pittsburgh, Pa., assignor to Dow Corning Corporation, Midland, Mich., a corporation of Michigan.

A composition of matter composed of a diorgano-polysiloxane of at least 5000 cs. viscosity at 250 C., a silica filler, an organic peroxide vulcanizing agent and from 1/16 to 10 parts by weight based upon 100 parts by weight siloxane of an additive selected from the group consisting of zinc oxide and zinc peroxide said siloxane having from 1.9 to 2 organic radicals per silicon atom said radicals being selected from the group consisting of alkyl, phenyl and siliconeopentyl radicals, at least 50 per cent of the total number of radicals being alkyl.

Stabilized Tall Oil Rosin

U. S. Patent 2,717,838. Justus C. Barthel and Randall Hastings, Stamford, Conn., assignors to American Cyanamid Company, New York, N. Y., a corporation of Maine.

A storage-stable dry rosin size consisting essentially of the dry saponification product of rosin remaining after the removal of the fatty acids from tall oil by fractional distillation stabilized by disproportionation to a minimum specific rotation of about +25 after incorporating about 0.5% to about 5% by weight of a member of the group consisting of sulfur and salts of non-oxidizing oxyacids of sulfur with strong bases therein, said rosin size also containing stabilizing amounts of an organic chemical rosin size antioxidant.

Coatings for Floorings and Walls

U. S. Patent 2,717,245. Annis G. Asaff, Auburndale, Mass., assignor to Callaghan Hession Corporation, Boston, Mass., a corporation of Massachusetts.

The method of forming a surface coating mastic comprising adding and mixing an aliphatic alcohol having less than four carbon atoms with a mixture of aggregate filler material and a vehicle therefor comprising firm-forming material selected from the group consisting of chlorinated rubber and polystyrene dissolved in a solvent comprising between about 50 and 75 per cent by weight of an acetate ester of an aliphatic alcohol having less than 6 carbon atoms and between about 50 and 25 per cent by weight of a liquid aromatic hydrocarbon in the proportion of between about 30 and 60 grams of film-forming material to 100 cc. of solvent, said alcohol being added until a two-phase separation of the mixture occurs, one phase being the mastic composition which is plastic and cohesive and of such non-sticky character that it can be spread with a trowel, and separating the two phases to obtain said mastic.

Treating Synthetic Drying Oils

U. S. Patent 2,719,163. John L. Ernst and Joseph L. Betts, Jr., Baton Rouge, La., assignors to Esso Research and Engineering Company, a corporation of Delaware.

A process for improving a synthetic drying oil which comprises, preparing a polymer drying oil of a conjugated diolefin hydrocarbon with sodium as a catalyst in the presence of a diluent to a viscosity below that ultimately desired, then subsequently heating the oil to a temperature below 200°C. in the presence of .01-2.5% of an anhydride selected from the group consisting of maleic, chloromaleic and citra conic anhydride and 0.2 to 1.0 mole of ammonia per mole of anhydride.

Water Insoluble Paint Compositions

U. S. Patent 2,719,091. Arthur S. Wendt, West Englewood, N. J., assignor to Fred Fear & Co., Brooklyn, N. Y., a corporation of New York.

A water-insoluble paint composition characterized by its non-toxicity and is dispersibility on a water surface, comprising an aluminum lake food color incorporated in a film forming medium formed from non-toxic resin selected from the group consisting of purified rosin, hydrogenated rosins and esters thereof, dammar gum, ester gums, coumarone-indene resins, terpene resins, pentaerythrityl tetra-abietate, alkyd resins and mixtures thereof, and edible essential oil selected from the group consisting of mint oil and citrus oil and fractions thereof and mixtures thereof and of said fractions.

The Thunder God who answers your "Knock on Wood"

Once in a while you may "knock on wood" when you tell a friend some pleasant news. Know what you're doing? You're calling on the Sky-and-Thunder God, who lives in an oak tree, to protect you and preserve your good fortune. At least that's how the tradition started thousands of years ago.

The good news in forest by-products today is more substantial. Unitol, the refined tall oil, protects your inventory position. It's always in supply, is easier to use than natural oils, simplifies your processing, and cuts costs.

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Salts of Sulfonated Polystyrene

U. S. Patent 2,718,514. Joel Fantl, Springfield, Mass., assignor to Monsanto Chemical Company, St. Louis, Mo., a corporation of Delaware.

A process for preparing a finely-divided substantially water-free water-soluble salt of sulfonated polystyrene which comprises adding polystyrene sulfonic acid to a mixture of about 80-99 parts by weight of a C_1 to C_3 aliphatic monohydroxy alcohol with about 20-1 parts by weight of water with agitation at a temperature of not more than about 5° C., said alcohol-water mixture having dissolved therein an amount of a hydroxide sufficient to neutralize the polystyrene sulfonic acid, said hydroxide being taken from the group consisting of ammonium and alkali metal hydroxides.

Polyvinyl Chloride-Polysulfone Resin Compositions

U. S. Patent 2,719,139. John E. Wicklatz, Bartlesville, Okla., assignor to Phillips Petroleum Company, a corporation of Delaware.

An improved resinous composition of matter comprising a major proportion of a polyvinyl chloride resin and a minor proportion of a resin produced by the copolymerization of sulfur dioxide with an unsaturated organic compound.

Modification of Drying Oils

U. S. Patent 2,719,164. Herman S. Bloch, Chicago, Ill., assignor to Universal Oil Products Company, Chicago, Ill., a corporation of Delaware.

A process for modifying an unsaturated fatty acid compound containing conjugated olefinic unsaturation selected from the group consisting of the fatty acids and the fatty acid esters derived from a natural glyceride drying oil which comprises reacting said compound in the absence of added catalyst with an aliphatic mono-olefinic hydrocarbon containing from 2 to 4 carbon atoms at a temperature of from about 50° to about 300° C.

Heat Hardening Epoxide Resins

U. S. Patent 2,717,885. Sylvan O. Greenlee, Racine, Wis., assignor to Devoe & Raynolds Company, Inc., Louisville, Ky., a corporation of New York.

Heat hardening epoxide resin compositions consisting essentially of an epoxide resin resulting from the reaction of a dihydric phenol with epichlorhydrin in the presence of caustic alkali and having admixed therewith as a latent curing catalyst a small amount of an addition product of boron trifluoride with an amine having at least one amine nitrogen atom which does not have directly linked thereto a negative radical.

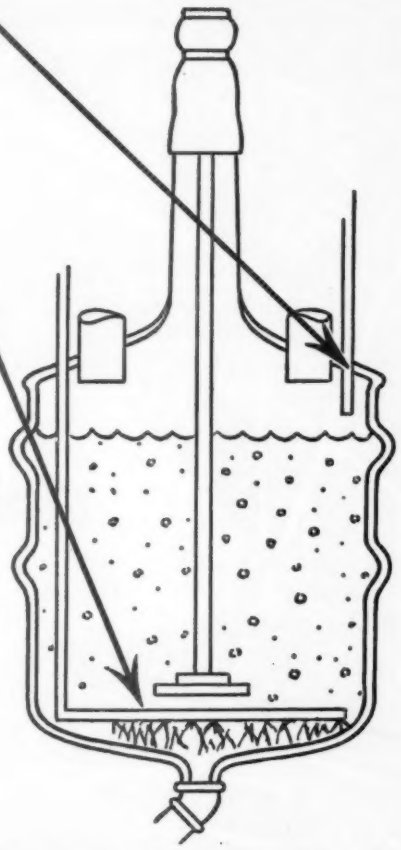
Stabilized Acrylonitrile Copolymers

U. S. Patent 2,719,140. Robert J. Slocombe, Dayton, and George L. Wesp, Englewood, Ohio, assignors to Monsanto Chemical Company, St. Louis, Mo., a corporation of Delaware.

A stable acrylonitrile polymer comprising a polymer of 20% to 100% of acrylonitrile and up to 80% of another monoolefinic monomer copolymerized therewith, said polymer containing intimately dispersed therein from 0.01% to 10% of a magnesium alkyl maleate in which the alkyl radical has from 1 to 14 carbon atoms.

CO_2 injected in top of cooking kettle forms an effective atmospheric blanket which guards against fire and explosion.

When sparged through cooking kettles, CO_2 gas keeps color light, prevents oxidation, aids agitation, absorbs moisture and speeds reaction.



ACTUAL TESTS PROVE

CO_2 CUTS OIL COOKING TIME 2/3!

Actual tests conducted in the laboratories of a major manufacturer* produced these conclusive findings:

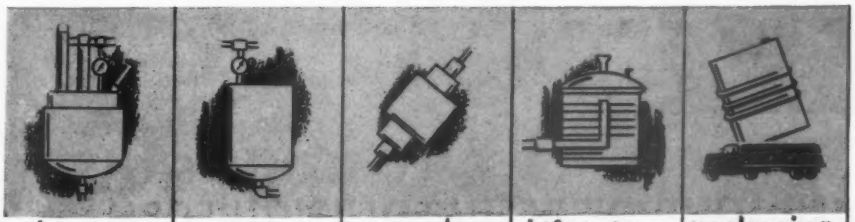
CO_2 sparging, added to conventional mechanical agitation, cut cooking time from 720 to 235 minutes! To achieve this remarkable saving, CO_2 functioned in 2 important ways—

1. **Sparged up through the mixture, CO_2** markedly increased agitation, causing faster, more even cooking.
2. **Water is "swept" away.** Passing up through the mixture, the CO_2 bubbles absorbed water vapor from the product—allowing the mixture to reach the desired cooking temperature sooner.

Tests Verify Another Important Fact — CO_2, when sparged through the reaction mixture, inerts it—effectively inhibits oxidation—color stays desireably light and constant.

*Name on request

OTHER WAYS A LIQUIFLOW† CO_2 SYSTEM CUTS COSTS IN THE PAINT PLANT



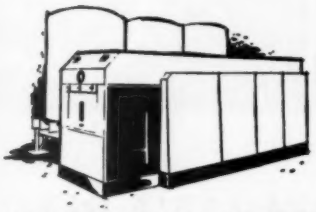
thinning
CO_2 in thinning tank retards oxidation, provides a fireproof "blanket".

storage
CO_2 "blanket" in storage tank prevents "skinning."

transfer
Under pressure from the Liquiflow† System, CO_2 is a safe, efficient transfer medium.

filtration
CO_2 used to purge filters recovers the oil, reduces cleaning time and frequency of cleanings.

packaging & transport
Inerting with CO_2 prevents "skinning", eliminates costly cleanouts.



†LIQUIFLOW CO_2 SYSTEM
Manufactured by The Liquid Carbonic Corporation. This unit assures a constant supply of chemically pure CO_2 anywhere in your plant. Let experienced LIQUID engineers show you how an integrated Liquiflow CO_2 System will improve your product and lower your operating costs.

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NATIONAL CONVENTION

(*From page 43*)

important items or burdened with a lot of dead stock. Of the two, I don't know which is worse, but both are expensive and dealers need a simplified workable inventory control.

Second, there is the problem of records. There are still too many paint retailers who are keeping their records in a cigar box—these men don't know where they are going mainly because they don't know where they have been. At the other extreme are the dealers who have invested in too much, too complicated, and too expensive a records system. To my knowledge there has never been a business procedure manual prepared for the operator of a retail paint store. Such a manual would blueprint the most simple but effective method for keeping records. There is a great need for such a manual and, I hope, that RPWDA—with the help of you manufacturers—can launch a study, analyze results and prepare such a manual for the dealer.

Third, dealers need a clear-cut guide to setting up advertising and promotion budgets. Our surveys show that the most successful retailers use various media and budget rules. But we need to know the amount to be spent and how it can be allocated for maximum results. You, as manufacturers, can be of great help to us in this field.

Fourth, sales training. This is a field in which RPWDA puts forth a great deal of effort, but mostly our efforts reach only the store owner level. It is also a field which you as a manufacturer, through your salesmen, can be a great deal of assistance to your dealers.

One of the big problems of the retailer is that of capable sales help. Often the dealer is forced to hire an inexperienced man, then because he, the dealer, is not only the sales manager but also the purchasing agent, the treasurer, office manager, bookkeeper and stock man, the new man many times doesn't get the training he needs. The result is an order taker instead of a sales person. These order takers at times then prove to be the bottleneck in making the final sale—the last two feet across the dealer's counter. He should have the opportunity of participating in store sales meetings, Paint Power Courses and area merchandising conference.

Fifth, a factor which is vital to all of us is capitalizing on this country's vast consumer credit market. We all know, I'm sure, that work is now underway on an industry-wide scale, on a time-payment selling program. This is, I think, the most important single project before us today and it cannot succeed without the support of every segment of the industry. The Joint Paint Industry Coordinating Committee is developing this program and we will all profit by giving to it our strongest support.

"Using Title I Loans to increase paint Sales" was delivered by Cyrus Sweet, Assistant Commissioner, FHA Title 1 Division.

Title I is designed to promote the type of home improvement in which you gentlemen are interested. Its function is to assist the home owner to modernize existing homes.

Title I is not a mortgage operation; it is a loan insurance program. During its existence, it has been used in every state and possession and has insured over 18 million loans totalling in excess of 8½ billion dollars.

The procedure for obtaining a Title I insured loan is simple and quick. Home owners and tenants holding long leases, and having a good credit standing, can borrow up to $2,500 for periods ranging up to three years which is repaid to the lender in monthly installments.

I have been told by Mr. Louis Fisher, of your association, that there are 30 million houses in the United States that have not been painted in 10 years. This huge total is exclusive of agricultural buildings, factories and other commercial buildings whose poor condition blight our cities and countryside, and which also qualify for maximum Title I financing for structural improvement.

Everyone benefits from this type transaction. *The customer* has the privilege of buying the way he wants to buy. He can take advantage of a one-visit shopping trip. He can afford better quality materials and a *bigger* job than if cash were needed. He gets complete package service. And finally, he has everything convenient, quick, simple and accurate and can pay for his entire job on his house in convenient monthly installments.

The dealer benefits because there is no recourse on time payment notes. He eliminates competitive pricing. He can sell up to $2,500. There is no down payment to block sales. He can give the customer up to 36 months to repay—while he gets cash on the barrel head.

The paint industry, however, to realize a full market for the sale of paint should not limit their thinking in terms of existing homes. For every home improvement the paint industry promotes, such as—carports, new utility and recreation rooms, wallpapering, porches, siding, garages, etc., you will sell another gallon of paint which would have otherwise remained on the shelf. There is hardly a home job you can think of where paint is not the finishing product. But the dealer has to sell more than the product; he has to satisfy the customers buying habits. It is up to the manufacturer to educate the dealers in the techniques of consumer buying. The customer may have the necessary urge and desire to paint but he has to be shown the way to pay; the answer to this is consumer financing and FHA Title I stands ready to help.

Estelle Tennis, Executive Director, Textile Color Card Assn. discussed the subject "How Industries Use Color to Promote Sales." She said—

Take, as an example, the thrilling new paint colors that give great beauty and flair to automobiles and are a powerful factor in attracting customers and inducing sales. These exciting color schemes are directly inspired by advance color trends in fashion and play a big role in the styling of exteriors and interiors of cars. Black automobiles account for only about ten percent of sales and have given way to a glamorous colorama, which includes turquoise and sea tones, a variety of cool greens in mint, lime, jade and other versions, a wide palette of appealing new blues, sun-touched yellows, beiges from the palest off-white to rich honey and carmel tones, also red and other lively hues and many other shades of the fashion spectrum. . . with accent on the lighter tones and on eye-catching combinations.

Earlier this year, when attending a great motor show of five car lines, I found they had available for customers a total of 223 different interior designs, colors and fabrics in two-tone and single-tone treatments, harmonizing or contrasting with 1261 different choices of single, two-tone and three-tone exterior color finishes. . .certainly a large enough choice to enable any woman to make up her mind!

I can think of no field of business which can better capitalize on the tremendous influence of color in our daily lives than the paint industry. Like countless other products involving color, paint cannot be sold profitably on a purely functional or practical basis. We expect, of course, the proper performance and quality, but it's the color excitement and fashion-rightness of merchandise that make it desirable in the customers' eyes. You have a golden opportunity to promote your products with increasing success by placing more and more emphasis on the color-appeal and decorative beauty of paint, and their psychological value in attracting consumer attention and winning sales.

In a world alive with color, the sales potentials of paint products are unlimited. We have seen how automotive paints make a rainbow of our highways, contributing beauty and sales-appeal to cars. In the same way, well styled paint colors give a new fashion look to exteriors and interiors of houses. Go into any section of newly built homes and you will note the increasing use of more colorful exteriors and trims. And, is there anything that improves the appearance of an older house and gives it a newer look more than a fresh coat of paint in an attractive color?

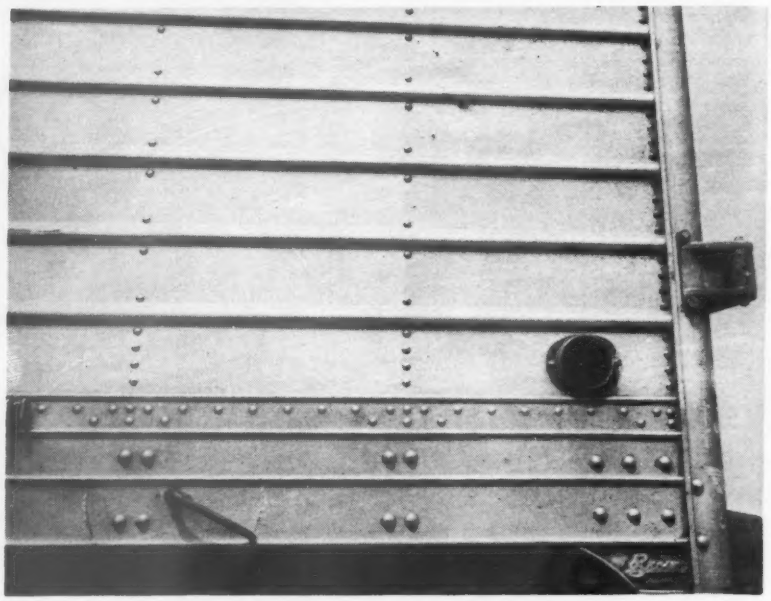
Other Forums

The Roof Coating and Roof Cement Manufacturers Forum was highlighted by a panel discussion which included Dr. H. R. Snoke, Chief of the Floor, Roof and Wall Coverings Section, National Bureau of Standards; Donald E. Davenport, roofing contractor and Ronald Brown.

Harry Ketchum acting director, Office of Distribution, Dept. of Commerce spoke at the Wholesale Distributors Division.

The Putty, Glazing and Caulking Compound Manufacturers' forum held a panel discussion which dealt with problems affecting this segment of the paint industry. The proper application of these products, the education of the consumer, and the effect of the increasing use of metal sash in modern construction were among the problems discussed. Panel members included are Gordon E. Hann, chairman, technical subcommittee; J. P. Jaunson, Aluminum Window Manufacturers Association; H. F. Johnson, and Otto Wenzler.

NEW COATING SUCCESS AFTER 16 MONTH TEST



Some time ago, the Egyptian Lacquer Mfg. Co. of S. Kearny, N. J., and Lafayette, Ind., one of the oldest manufacturers of protective coatings in the country, approached Eastman Chemical Products, Inc. of Kingsport, Tenn., and suggested that the two companies pool their know-how in order to develop an easily appliable, long-life lacquer for outdoor aluminum surfaces. Since it was well known that a maintenance problem existed in the trailer-truck industry, representatives of the two firms called on one of the largest trucking concerns in the South, The Mason & Dixon Lines, Inc., with headquarters and large terminal facilities in Kingsport. Anything that could help get the trailers out on the road faster was of definite interest to Mason & Dixon and, therefore, they were pleased to make their facilities available. The result of their three way co-operative effort is a new product named "Clear Coating-CH64." The above photo shows a close-up of the side of a trailer after a 16-month test with the product. The film is still intact around dented area at extreme left of picture. No loss of adhesion occurred, even though lacquer coating was penetrated. Bare aluminum of right-hand panel shows corrosive pitting and dulling at every point.

Tall Oil In Protective Coatings Discussed

"Tall Oil In Protective Coating Vehicles" was discussed by George H. Eick, technical service manager, Arizona Chemical Co., at last month's meeting of the Toronto Paint and Varnish Production Club.

The presentation was illustrated with slides giving a rebus picture of the manufacture of tall oil and how the soap skimmings are recovered prior to acidulation and conversion to crude tall oil. A typical fractionation column was shown and the speaker described how the distilled and tall oil fatty acids as well as the tall oil pitch and rosin are recovered.

Esterification procedures were described in detail with emphasis placed upon proper mixing technology. A slide illustrated the proper positioning of the impeller on the vertical shaft and the correct usage of baffles in an alkyd resin or esterification kettle which, in turn, prevents centrifuging and assures the operator of a proper mixing pattern. The correct usage of coils in a kettle, and the correct usage of a gas absorber where light color products are required, were also shown.

The lecture included typical formulations, such as: Epoxy and Methyl Glucoside Esters; Phenolic Modified Varnishes; Uniphase and Unmodified in Situ Varnishes; Isophthalic—Tall Oil Fatty Acid Alkyds; Long, Medium and Short Oil Alkyds, based upon Tall Oil Fatty Acids. Various modifications of Tall Oil Rosin were compared with wood and gum rosin illustrating, in table form, the physical properties expected.

CALENDAR OF EVENTS

Nov. 15-17. Annual Meeting of Retail Paint and Walldealers Assoc. Cleveland, Ohio.

Dec. 5-7. Chemical Specialities Manufacturers' Assoc. Annual Meeting, Hotel Roosevelt, New York, N. Y.

Feb. 29-Mar. 2, 1956. 20th Annual Convention Southern Paint and Varnish Production Club, Atlanta Biltmore Hotel, Atlanta, Ga.

Production Club Meetings

Baltimore, 2nd Friday, Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
Dayton — Nov., Feb., April, Suttmillers.
Indianapolis — Sept., Claypoll Hotel.
Columbus — Jan., June, Fort Hayes Hotel.

Cleveland, 3rd Friday, Harvey Restaurant.

Dallas, 2nd Thursday, No Fixed Place.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, 3rd Monday, El Jardin Restaurant, San Francisco.

Houston, 2nd Tuesday, College Inn.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, University Club, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, Annual Meetings Only.

Philadelphia, 3rd Wednesday, Engineer's Club.

Pittsburgh, 1st Monday, Fort Pitt Hotel.

Rocky Mountain, 2nd Wednesday.

St. Louis, 3rd Tuesday, Forest Park Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Diana Sweets, Ltd.

Western New York, 1st Monday 40-8 Club Buffalo.

NEWS

Paint Industry Trends Discussed by Editor

This year will go down as the best in the paint industry's history, according to Anthony Errico, editor, *Paint and Varnish Production.*

He attributed this upswing in paint sales to high construction activity; record automobile production; a high level of redecoration, maintenance improvements among home owners and industry; and continued prosperity and high consumer spending.

Mr. Errico made these observations in a talk on "Current and Future Trends in the Paint Industry" given at this month's meeting of the New York Paint and Varnish Production Club.

He said that in the expanding economy, ". . .there is every indication that the gross sales of paint and allied products could approach the two billion dollar mark within the next five years." This would be a half billion dollars over last year's sales.

He discussed the innumerable uses to which radiation energy and radioisotopes can be put in the research and manufacture of paint products.

Mr. Errico also discussed new product development, the effect of mergers in the industry, problems of attracting more technically-trained men to the industry, etc. The text of the entire speech will appear in the next issue of this magazine.

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Foreign Visiters at School

An international aspect was recently exhibited at the DeVilbiss Co. spray painting school, Toledo, Ohio, with three students attending from Switzerland, Thailand and Japan.

The trio—Rolf Doerks, Bern, Switzerland; Somyot Ruanglek, Bangkok, Thailand; and Einosuke Sato, Tokyo, Japan—visited the school to gain a greater knowledge of automotive spray refinishing methods. Their tour of the U.S. and the trade schools was arranged by the export division of Chrysler Corp.

NEWS

Push-Button Terminal Opened by Celanese Corp.

The Chemical Division of Celanese Corporation of America has opened a new chemical storage terminal in Newark, N. J. as the eastern distribution center for a broad list of liquid and dry chemicals it produces.

This modern push-button terminal has initial capacities of 4,000,000 gallons of liquid chemicals, 1,000,000 pounds of dry products and, in addition, a substantial drumming capacity.

R. W. KixMiller, vice president and general manager of the Chemical Division, said it will provide the company with an accelerated and highly efficient system for the distribution of chemicals in the rapidly expanding eastern market. Adequate storage capacity, improved pumping facilities and a remote electrical control system which is operable from several locations, he added, will bring about greater flexibility and maximum customer service.

"Celanese-produced chemicals ranging from solvents such as acetone and alcohols to intermediates such as formaldehyde and acetic acid," Mr. KixMiller continued, "arrive at Newark by ocean tanker and railroad tank car. Stored in 27 tanks and two warehouses these materials can be distributed to our customers by either water, rail or land in either drum, tank car, tank truck, carload or barge quantities.

NO CONTAMINATION: Since hose lines pumping chemicals from a tanker are clearly marked for use of one specific product, contamination is not a problem.

"Theoretically, every one of the more than 50 different chemicals manufactured by our Texas plants can be handled through the terminal. We are equipped to spoon-feed our customers or supply them with tank car quantities."

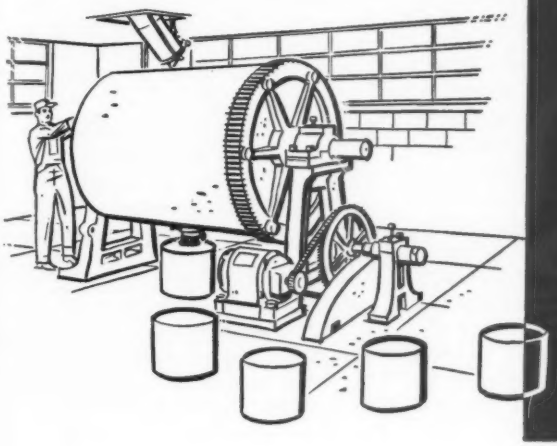
Among the important consumer products which will be supplied from the terminal are solvents, intermediates and plasticizers.

Approximately 15 miles of piping leading to storage tanks and loading points have been installed. Each tank is earmarked for a specific chemical and has its individual transfer pump and line. This system eliminates the necessity of cleaning lines which would be required if the tanks and lines were used for multiple chemicals, and obviates contamination hazards.

One of the features of the terminal is an 840,000-gallon formalin storage tank fabricated from a special type aluminum. This is the fourth largest aluminum tank in the world, and the largest ever fabricated from the particular alloy. A second 840,000-gallon tank for the storage of methanol is made of carbon steel. Other tanks are made of stainless steel and carbon steel, some of which are resin lined for quality protection.

HARSHAW DRIERS

Comply with the Strict Tolerances Needed for Highest Quality



Harshaw's precise manufacturing specifications demand the following tests for every batch of driers produced:

- **Metal content**
- **Specific gravity**
- **Color**
- **Viscosity**
- **Total solids content**
- **Flash point (TCC)**
- **Moisture content**
- **Acid value**
- **Miscibility with raw linseed oil**
- **Miscibility with mineral spirits**
- **Benzene insoluble content**
- **Customer's specified tests**

Order your next requirement of driers from Harshaw. They are produced and tested at our plant in Gloucester City, N. J. where we have the most modern facilities available. Harshaw Driers are distributed nation-wide through 18 stock points.

TYPICAL HARSHAW DRIERS

LIQUID DRIERS

- Uversol (Naphthenate) Liquids
- Linoresinate Liquids
- Linoleate Liquids
- Lithos
- Octasols
- Pastes
- Pastalls

SOLID DRIERS

- Uversol (Naphthenate) Solids
- Linoresinate Solids
- Linoleate Solids
- Soyate Solids
- Fused Resinates

POWDERED DRIERS

- Precipitated Resinates
- Drying Salts:
  - Cobalt
  - Lead
  - Manganese
  - Zinc

THE HARSHAW CHEMICAL CO.
1945 East 97th Street, Cleveland 6, Ohio
BRANCHES IN PRINCIPAL CITIES

NEWS

Nitroparaffin Symposium Held In New York City

A Nitroparaffin Symposium sponsored by Commercial Solvents Corp., was held Oct. 25 at the Waldorf-Astoria Hotel, New York.

Commercial Solvents originally sponsored the research work at Purdue University which led to the development of processes and products.

A paper on "The Nitroparaffins as Solvents for Technical Coatings," was presented by Warren C. Ashley, Technical Sales, Proxylin Products, Inc.

Mr. Ashley discussed general properties of good solvents from the point of view of practical requirements and the physical characteristics of the mixture and its individual components.

He evaluated Nitroparaffins on the basis of physical properties and unit cost, compared to equivalent esters, alcohols, ketones and aromatic esters. He then discussed in detail Nitroparaffins as solvents for the vinyl resin co-polymers and cellulose acetate.

S. H. Shapiro, Head, Methods and Standards Section, Armour Chemical Div., Armour & Co., spoke on "Tris(Hydroxymethyl)-Aminomethane and Reaction Products with Fatty Acids and Formaldehyde."

He said that a series of compounds with unique properties is obtained by condensing three moles of fatty acid with one of Tris(Hydroxymethyl)Aminomethane, and then reacting the condensate with formaldehyde. When poly-unsaturated drying oil acids are used the product has properties similar to chinawood oil. By varying the fatty acid, the nature of the condensate is altered so that the range of products obtainable include plastic-like materials, hard waxes, and plasticizers in addition to drying oils. All of these materials have excellent alkali resistance.

Other papers delivered at the symposium include "Chronology of the Nitroparaffin Development," Dr. R. S. Egly, Director, Nitroparaffin Development, Commercial Solvents Corp.; "The Nitroparaffins—An Example of University-Industry Cooperation," Dr. R. B. Stewart, Vice President and Treasurer, Purdue University; "AMP In Modern Self-Polishing Waxes," R. T. Means, Technical Service Sales Engineer (Co-Author: M. E. Bolton) Petrolite Corp.; "The Future of Nitroparaffins," Dr. Ralph A. Morgen, Director of Research, Purdue Research Foundation; and "Use of Hydroxylammonium Sulfate as a Short-stopping Agent for Paracrils," Dr. William F. Tuley, Naugatuck Chemical Div., U.S. Rubber Co.

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Atlas Powder Co. Realigns Chemical Research Set-Up

Atlas Powder Company has basically realigned its chemical research and development organization and staff to strengthen long-range research and product diversification programs, according to Edward J. Goett, vice president in charge of the firm's Chemicals Division.

The new set-up is designed to facilitate effective research teamwork by clearly defining areas of responsibility and by simplifying evaluation and control of research projects.

Joining the Atlas staff to direct the Chemical Research Department phase of the work is Dr. Walter H. C. Rueggeberg, formerly Director of Organic Research and Development for Tennessee Corporation. A graduate of Johns Hopkins University's School of High Studies in Chemistry, Dr. Rueggeberg was with Carbide and Carbon Chemicals Co. before the war. From 1942 to 1950, he served in the U. S. Army Chemical Corps as an officer and civilian, his assignment at the close of the period being as Assistant Scientific Director of the Corps' Chemical and Radiological Laboratories. He joined Tennessee Corporation in 1950 to establish their organic chemicals research program.

Marshall T. Sanders, will continue to head the Chemical Engineering Department.

Director of the new Product Development Department is F. Faxon Ogden, who joined Atlas in September after 20 years with Monsanto Chemical Company.

TECHNICAL Bulletins

PILOT PLANT

A data sheet describing a complete and compact 15-gallon reaction-distillation pilot plant is offered by The Patterson-Kelley Co., Inc., 10 Lackawanna Ave., E. Stroudsburg, Pa.

The sheet describes the principal components of the pilot plant—15-gallon reactor, condenser, decanter, receiver and piping—as well as heating and cooling units and special explosion-proof instrumentation. A schematic drawing illustrates these features, plus pressure and temperature controls and indicators placed at critical points in the system. Three photographs of the pilot plant and its instrument panel are included.

SYNTHETIC RESINS

A 44-page booklet on its "Synthetic Resins" for use in the manufacture of surface coatings, has been issued by Reichhold Chemicals, Inc., White Plains, N.Y.

The illustrated booklet gives suggestions for representative materials employed in a wide variety of applications in many fields; standard test methods (for hard resins, alkyd resin solutions and urea-formaldehyde resin solutions); and comparison charts.

ACRYLIC RESIN EMULSION

The second progress report on "Rhoplex AC-33" for exterior emulsion paints has been published by Rohm & Haas Co., Philadelphia 5, Pa.

The 42-page, illustrated, two-color brochure contains a summary; exterior exposure experience with product (formulations under test; detailed exposure results; and summary of exposure results); suggestions for exposure studies; large scale application of exterior paints based on product; manufacture of exterior paints (preparation of paints, dispersants, additives); application of exterior paints with product; advantages of paints based on product (to the paint user, to manufacturer); and design of exposure tests.

SEQUESTERING AGENTS

A full description of the effect and use of the "Tetrines," chelating and sequestering agents, may be obtained from the Glyco Products Co., Inc., Empire State Building, New York 1, N. Y.

ALKYD RESINS

Specifications, film properties and resin characteristics, and uses are described in an 8-page, two-color booklet on "Glyptal" alkyd resins. Booklet issued by the Chemical Materials Dept., General Electric Co., Schenectady, N.Y.

WET GROUND MICA

Technical bulletin No. 21 is entitled, "An Opaque Window Paint Based on the Light-Scattering Effect of Wet Ground Mica."

An introduction and a discussion of the test paint is followed by a table on, "Reflectance Readings of the Test Paint Using Photovolt Reflection Meter With Tri-Green Filter (White Enameled Standard: 100%)."

A discussion and comment on light transmission of the test paint and a table, "Light Transmission of a 100 Watt Bulb Through the Test Paint Using a Weston Light Meter," conclude the bulletin.

AEROSOLS

"Aerosols Unlimited," a brochure describing the post-war revolution in packaging, has been published by Sprayon Products, Inc., 2065 E. 65 St., Cleveland 3, Ohio.

The book traces the development of the self-spraying package, discusses the pros and cons of the push-button container, tells manufacturers how they can evaluate their products for the aeroso package and what advantages can be expected from it.

PIGMENT DISPERSIONS

A bulletin describing and displaying the new line of "Accosperse" pigment dispersions for latex paint has been released by the Pigments Division of American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N.Y. Properties of the line, comprising Hansa yellow, toluidine red, naphthol scarlet, red and green shade phthalocyanine blue, phthalocyanine green and Pigment Green B as the pigment components, are covered in detail.

Data on permanency to light, pH of system, consistency, specific gravity and bulking value are included for the benefit of the formulator of latex paints.

EMULSION PAINT

Bulletin No. 10100, describing "Gelva Emulsion Paint 243," presents a suggested formulation for preparing a high quality exterior white paint based on "Gelva Emulsion TS-22."

Shawinigan Resins Corp., Springfield, Mass., offers the bulletin in order to provide a starting point for those unfamiliar with the manufacture of polyvinyl acetate paints since numerous modifications can be made to fit individual conditions.

ADDITIVES

The September issue of "Raybo References," published by Raybo Chemical Co., Huntington, W. Va., discusses some of the additives put out by the company and tells how to get most benefit from their use.

CONTROLLED VOLUME PUMPS

Milton Roy Co., Station O, 1300 E. Mermaid Lane, Philadelphia 18, Pa., has released a 4-page, two-color bulletin, No. 955, describing the latest addition to its line of controlled volume pumps for low capacity flow control.

Brochure details operation of stroke length adjusting air servo system, and includes information on application, features and specifications. Diagrams are given showing major components of the new unit, and also detailing its application and hook-up in a typical pneumatic flow-control system.

INSTRUMENTS

An 8-page, illustrated, two-color bulletin, No. 330, describes a line of extrusion rheometers, including a micro-rheometer for quantities as small as 1/10th. milliliter; a new paint mill for formulation and development of small laboratory samples; a new versatile, multi-

purpose process unit for high polymer resin processing, polymerizations, and other controlled organic reactions; and a gelometer, with a constant temperature bath, for automatic determinations of gelation time or stability of polyesters or phenolics in research, control or production.

Copies available from Burrell Corp., 223 Fifth Ave., Pittsburgh 19, Pa.

PRODUCT SPECIFICATIONS

Emery Industries, Inc., Dept. 5, Carew-Tower, Cincinnati 2, Ohio, has issued, "Emeryfacts, Specifications and Characteristics," a brochure containing revised, up-to-date specifications of its entire line of products.

Products included are stearic acids, oleic acids, hydrogenated fatty acids and glycerides, animal and vegetable fatty acids, special fatty acids, plasticizers, and oleic esters.

GAS CHROMOTOGRAPHER

Booklet 83, offered by Burrell Corp., 2223 Fifth Ave., Pittsburgh 19, Pa., describes "The Kromo-Tog," a new self-contained instrument for the analysis of gases and liquids by gas chromatography.

Fully explained is the elution method of analysis for which the instrument provides all of the basic instrumentation needed by the modern laboratory.

It features extreme flexibility embodying simplicity of design, ease of operation and wide usefulness including many applications for which there is no other practicable method. Typical applications include separation of closely boiling isomers of gas and liquid organic compounds, determination of trace components, rapid routine analysis for a control component, analysis of fractions from organic distillations and analysis of organic acids, alcohols, ketones, aromatics, esters and other organic liquids.

UREA

A booklet describing "Plaskon" urea and melamine coating resins for modern industrial baking enamel systems has been released by the Barrett Division, Allied Chemical & Dye Corp. 40 Rector St., New York 6, N. Y.

The booklet presents complete properties of these resins together with recommendations for use.

Spray Booth Overseas

The traveling spray booth, manufactured by The DeVilbiss Co., Toledo, Ohio, is taking a trip of its own aboard the M. S. Ryholm, Swedish-American Lines vessel, bound for Oslo, Norway.

This marks the first traveling spray booth sold overseas by the export division of the company. Many of these booths are in use throughout the United States by railroads, one type of which is completely automatic and paints four box cars in less than an hour.

New Book

Handbook of Engineering Materials

By John Seastone and Dr. Douglas F. Miner. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y. 1,382 pages. Price $17.50.

John Seastone, manager of research, development and engineering for the Metals Division of Olin Mathieson Chemical Corp., and Dr. Douglas F. Miner, director of the division of student personnel and welfare at the Carnegie Institute of Technology, are co-editors of this new handbook aimed at helping the engineer make a proper selection of materials. It was written by a group of over fifty specialists, each an expert in a particular field of materials technology.

Information is so arranged to make comparisons of competitive materials easy. The handbook also deals with the changes which take place in materials during fabrication, and will help the engineer in computing costs.

The book is divided into four main sections:

It provides general information on specifications and standards, statistics in the application of materials and mathematics and physical tables.

It discusses metals including ferrous metals, aluminum, magnesium, copper and its alloys, zinc, nickel and its alloys, and other pure metals. It also discusses many special purpose alloys.

Details on non-metals are given. Wood and wood-base materials, paper, fibers, plastics, rubbers, organic finishing materials, fuels, carbon products, ceramic materials, industrial chemicals, and lubricants are covered.

Construction materials with analysis of cementing materials and concretes, roadbed materials, timber, rope, foundations, weather and moisture protection, and glass products are treated in the final section.

NONDRYING ALKYDS

(*From page 35*)

after three months the panels were in excellent condition. These data, along with observations on sanding, buffing, and patching characteristics are believed to be ample evidence that acceptable lacquers for many ndustrial applications can be formulated from inexpensive tallow acids.

PIGMENT DISPERSIONS

Constituent	*Weight Per Cent* *Black*	*White*
Tallow Acid Alkyd (60 per cent N V M)	74.0	55.2
New Spectra Mark II	6.2	
Butyl alcohol	1.0	
Butyl acetate	2.8	
Denatured alcohol	0.8	
Xylene	3.2	
Dibutyl phthalate	12.0	9.2
Titanium oxide		17.8
Antimony oxide		17.8
	100.0	100.0

The pigment grinds were passed twice over a three-roll paint mill.

LACQUER BASE

Constituent	*Weight Per Cent* *Black*	*White*
¼" RS nitrocellulose (70 per cent N V M)	36.5	39.4
Butyl acetate	21.6	22.7
Butyl alcohol	13.1	7.6
Denatured alcohol (Paco)	5.8	6.0
Xylene	23.0	24.3
	100.0	100.0

SOLVENT BLEND

Butyl acetate	37.5
Butyl alcohol	12.5
Denatured alcohol (Paco)	10.0
Xylene	40.0
	100.0

LACQUER COMPOSITIONS

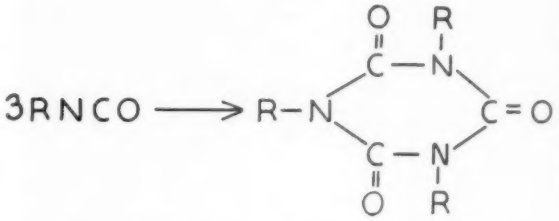
ngredient	*Weight Per Cent* *Black*	*White*
Pigment Dispersion	25.7	23.6
Lacquer Base	59.3	38.9
Lacquer Solvent	15.0	37.5
	100.0	100.0
Per cent solids in lacquers	31.2	29.3

ISOCYANATE RESINS

(*From page 31*)

Methyl diisocyanate has been polymerized in the presence of chloroform, dried with calcium chloride and with sodium sulfate (240) The condensation of chlorinated polyisocyanates has also been studied.

Ethyl isocyanate gives a trimer when contacted with triethyl (262) phosphine. (75) Phenyl isocyanate reacts similarly with dimethyl phosphine. (342) Other catalysts which have been used to induce trimerization of either aromatic or aliphatic isocyanates are: calcium acetate, potassium acetate, sodium formate, sodium carbonate, sodium methoxide, triethyl amine, oxalic acid and peroxides. (5) The generally accepted structure of the trimer is the one shown in reaction R_{36}—a trisubstituted cyanuric acid.



The foregoing reactions have served to show the extreme versatility of isocyanates as organic reagents. Part II will serve to indicate some of the uses to which these products have been applied. Bibliography will also be included.

ADVERTISERS' INDEX

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233) showing the Ownership, Management, and Circulation of PAINT AND VARNISH PRODUCTION, published monthly at Easton, Pa., for October 1, 1955.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: John Powell, 855 Avenue of the Americas, New York City.
Editor: Anthony Errico, 855 Avenue of the Americas, New York City.
Managing editor: None
Business manager: None

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.) Powell Magazines, Inc., 855 Avenue of the Americas, New York City.

John Powell, 855 Avenue of the Americas, New York City.
Ira P. MacNair, 254 W. 31st Street, New York City.
Alice L. Lynch, 855 Avenue of the Americas, New York City.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only).

JOHN POWELL, publisher

Sworn to and subscribed before me this 5th day of October, 1955
(SEAL)

Daniel D. Randall.
Notary Public, State of New York
No. 03-8491000
Qualified in Bronx County
Certs. filed with Bronx and New York
County Clerks and Registers
(My commission expires March 30, 1956)

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CYCOPOL® Resin 340-18

for

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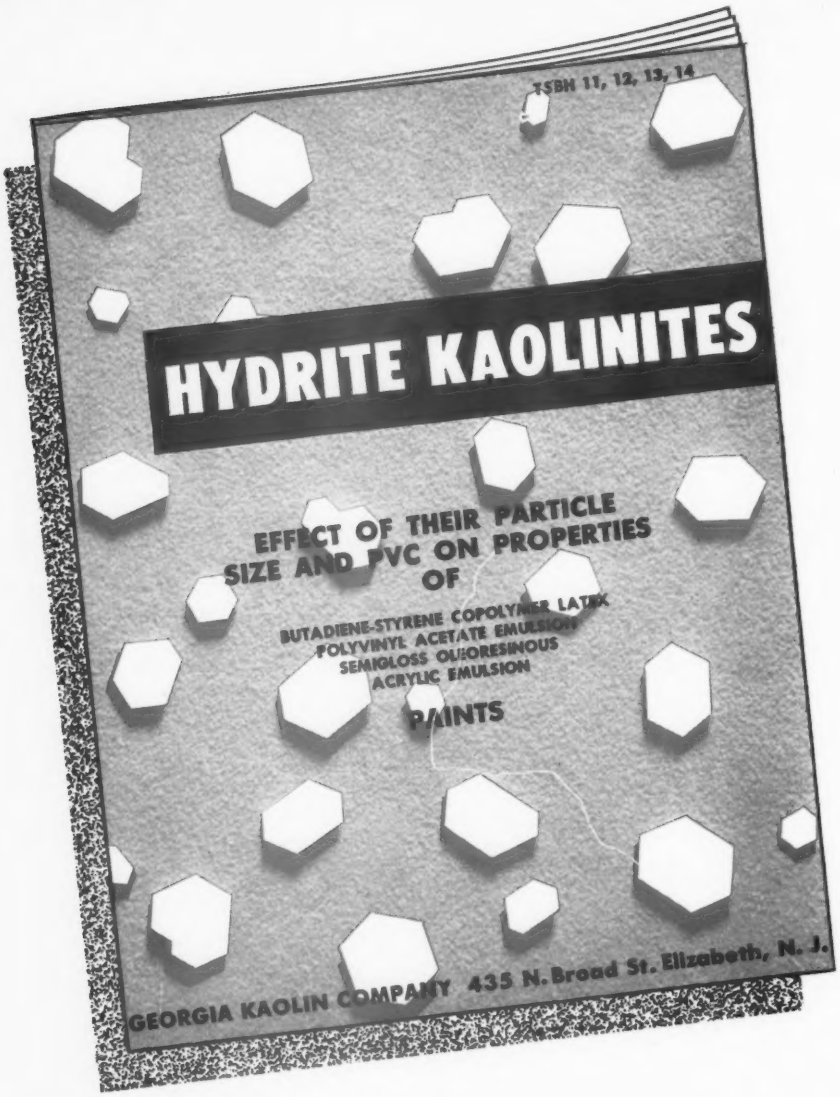
PLASTICS & RESINS DIVISION
30 Rockefeller Plaza, New York 20, N. Y.

In Canada: North American Cyanamid Limited, Montreal & Toronto



For SPECIFIC results in paint formulations select the CORRECT GRADE of HYDRITE KAOLINITE

Today there are many different grades of HYDRITE Kaolinites from which the paint formulator may choose . . . to suit his particular needs.

Each grade has its own precisely controlled proportions of plates and stacks—the characteristic particles of which kaolinites are composed. The ratio of plates to stacks, the chemical, physical, and colloidal properties of HYDRITE Kaolinites, all have an important bearing on the properties which they impart to paint systems.

To better familiarize the formulator with the behavior of the different grades—so that he may take advantage of the opportunities which each offers for improving quality and reducing cost—the Georgia Kaolin Company has prepared this comprehensive booklet. Send for your free copy now! Ask for TSBH 11, 12, 13, 14.

GEORGIA KAOLIN COMPANY

435 North Broad Street, Elizabeth, N. J.